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Fifteenth Annual Conference on Educational Measurements

Held at Indiana University
April 20 and 21, 1928

Bureau of Coöperative Research, Indiana University School of Education

HENRY LESTER SMITH, Director

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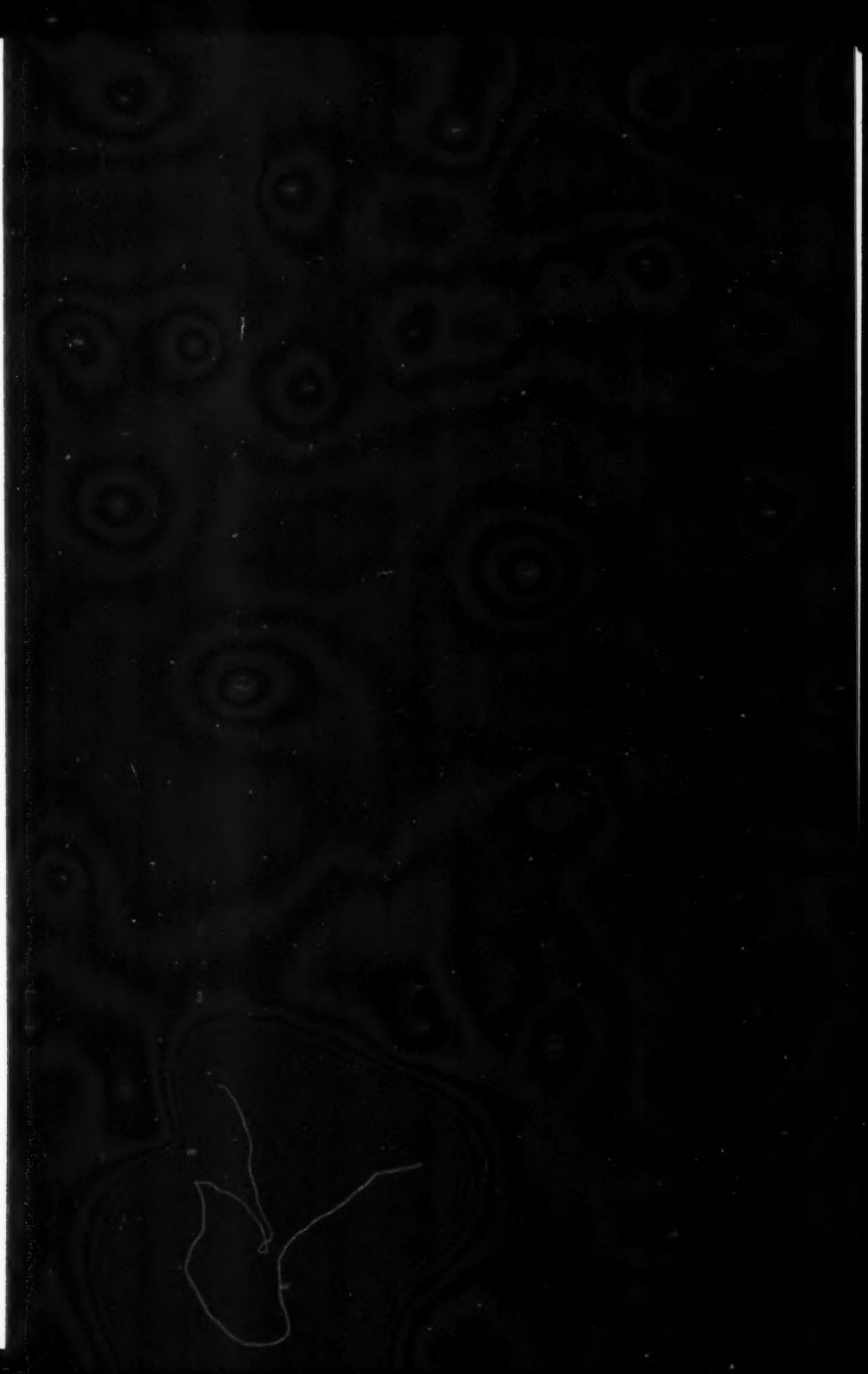

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Program of Conference on Educational Measurements

April 20 and 21, 1928

First Session, Friday, 10:00 a.m.

George L. Roberts, Head of the Department of Education, Purdue University, presiding.

10:00 Address of Welcome. President William Lowe Bryan, Indiana University.

10:15 The Effect of Environment on the IQ and its Significance on the Interpretation of Intelligence Test Scores. Dr. Frank N. Freeman, Professor of Educational Psychology, University of Chicago.

11:00 Measurement of Vocabulary. Dr. Edward L. Thorndike, Professor of Education and Director of the Division of Educational Psychology, Institute of Educational Research, Teachers College, Columbia University.

Second Session, Friday, 2:00 p.m.

George C. Carroll, Superintendent of Schools, Terre Haute, presiding.

2:00 Preliminary Report on the Evaluation of Certain Practice Pads in Arithmetic. Wendell W. Wright, Associate Professor of Education, Indiana University.

2:30 Measuring Changes in School Bond Prices. Dr. Harold F. Clark, Professor of Education, Indiana University.

3:00 The Psychology of the School Dictionary. Dr. Edward L. Thorndike, Professor of Education and Director of the Division of Educational Psychology, Institute of Educational Research, Teachers College, Columbia University.

Third Session, Friday, 8:00 p.m.

Dean H. L. Smith, School of Education, Indiana University, presiding.

8:00 Adult Learning. Dr. Edward L. Thorndike, Professor of Education and Director of the Division of Educational Psychology, Institute of Educational Research, Teachers College, Columbia University.

Program of Conference on School Counseling

First Session, Saturday, 9:30 a.m.

John O. Chewning, Superintendent of Schools, Evansville, presiding.

9:30 Measurement of Interest as an Aid to Vocational Counseling. James W. Richardson, Vocational Counselor, Arsenal Technical Schools, Indianapolis.

10:15 Educational Tests and Educational Guidance. Dr. Edward L. Thorndike, Professor of Education and Director of the Division of Educational Psychology, Institute of Educational Research, Teachers College, Columbia University.

11:15 Methods for Investigating an Individual's Unmeasured Characteristics. Edgar L. Yeager, Assistant Professor of Psychology, Indiana University.

Second Session, Luncheon Program, Saturday, 12:00 noon

Dean H. L. Smith, Indiana University, presiding.

12:30 What a Small High School can do in Counseling its Students. W. S. Milburn, Principal, High School, Silver Lake, Indiana.

12:50 The Need for Vocational Guidance in Teacher Training in Indiana. Robert K. Devricks, Director of Studies, Indiana State Normal School, Terre Haute.

1:10 What Should the Liberal Arts College do in Vocational Guidance? Dr. Horace W. Marshall, Vice-President, Indiana Central College, Indianapolis.

A Study of the Effect of Environment on the Intelligence of Foster Children

FRANK N. FREEMAN, Professor of Educational Psychology, University of Chicago

THE investigation which I am here reporting was made for the purpose of determining whether the home environment of the child has an effect on his intelligence, as measured by an intelligence test. It bears upon the question whether the child's intelligence is entirely or almost entirely determined by heredity, and sheds some light upon the general problem of the relation between heredity and environment as factors in the individual's mental development.

The investigation of the problem of heredity and environment has proved to be a difficult one on account of the difficulty of dissociating these two factors either statistically or experimentally. In the genealogical method, such as has been used by Galton, Woods, and Goddard, for example, superior heredity and superior environment on the one hand, or inferior heredity and inferior environment on the other hand, commonly go together, so that it is impossible to say how far an individual's grade of intelligence is due to the one or to the other influence. Thus Cattell attributes largely to environment the geographical distribution of American men of science which others would attribute chiefly to heredity.

Again, comparisons of the differences in intelligence between large groups of persons are commonly open to a variety of interpretations, according to one's predilection concerning the relative influence of nature and nurture. When it is found that there is a rather close correspondence between one's intelligence and the length of one's schooling this fact may be taken to mean that schooling increases intelligence or that intelligence enables one to survive the demands of school. The fact that the level of intelligence of the men of a state corresponds rather closely to the excellence of its system of schools and to the amount of reading done by its inhabitants may mean that schools and reading determine intelligence or that intelligence determines the schools and the reading. Similarly with the comparison between urban and rural population, population in the various districts of a city, men in various occupations, or their children, and immigrants who have come to the United States in different periods of time.

So far as I am aware, no attempts have been made to attack this problem experimentally. The environment of children has often been radically changed, but this has not been done for the explicit purpose of scientifically measuring the effect of such change, nor in fact have careful measurements of the effects of such changes been made.

There is a group of children whose environment has been radically changed, or who at least are placed in an environment which is, on

the whole, markedly different from that of their parents and from the environment in which their lives would have been spent if they had remained with their parents. I refer, of course, to foster children. The adoption of children may be called a kind of unintentional experiment in the effect of environment on intelligence. If suitable measurements were made upon the children before and after adoption and if measurements and ratings were also made of true parents and foster parents as well as of the original and the foster home, a definite answer could be found to the question of relative effect of home environment and parental intelligence. Failing these complete data, we have still found it possible to make measurements which throw considerable light on the problem.

The details of the investigation are reported elsewhere,* and I shall here merely report briefly the most important findings and make a few interpretative comments.

Our first comparison concerns the change in the intelligence of a group of children between the time of their adoption and a time some years later. A measured change in a group of individuals which takes place coincidently with a change in their circumstances furnishes better evidence of a causal relationship between the change and the circumstance than does a correlation between them in the case of different individuals. The evidence furnished by this group, therefore, is the most direct which we have been able to secure. We were fortunate in finding a group of seventy-four children who had been tested by the Institute for Juvenile Research just before they were adopted. They were then placed immediately in foster homes and had remained for an average period of four years when they were retested by us.

We found an average gain in I.Q. for the entire group of 2½ points. From tables which are given by Terman in a report of the Standardization of the Binet Scale and from surveys of two large groups of children of different ages tested in the University of Iowa and in the University of Chicago, it appears that the mean I.Q. of children tested by the Stanford Revision falls with increasing age. We found the mean for Terman's data to be 104 at eight years of age and 99 at twelve years of age, a drop of 5 points. These ages correspond to the mean ages of our group in the first test and in the second test. If we make corrections for this drop our gain becomes 7.5 instead of 2.5.

If we divide our group into two according to the rating of the foster homes we find that the gain made by 33 children in better homes is 5.3, or corrected is 10.3. The gain made by the group in poorer homes, on the other hand, is 0.1. Again, if we divide the group into those who were adopted younger and those who were adopted older, we find a marked difference. The children who were adopted at less than the mean age of the group made a gain of 5.2, and those adopted at an age older than the mean, a loss of .4. If we make

* "The Influence of Environment on the Intelligence, School Achievement and Conduct of Foster Children." By Frank N. Freeman, Karl J. Holzinger, and Blythe Clayton Mitchell. Twenty-seventh *Year Book* of The National Society for the Study of Education. Public School Publishing Co., 1928.

the same correction as before, the children who were adopted at less than the mean age made a gain of 10.2. If we accept the correction which was used, the result indicates that the adoption of children into fairly good homes may produce on the average a gain of 10 points in I.Q. in a period of four years.

Our next comparison has to do with those foster children who are full brothers and sisters or siblings. A number of studies have measured the resemblance between siblings by finding the correlation between them in various traits. These correlations are usually in the neighborhood of .50. This resemblance is usually attributed to the similarity in the heredity of brothers and sisters. It is, however, probable that this resemblance is due in part to the similarity in the environment of siblings since under ordinary circumstances they live in the same environment. In the case of foster children siblings are frequently separated. If the resemblance then is due entirely to heredity, this separation should not affect it. If it is due in part to environment, we should expect the resemblance to be reduced. We found 125 pairs who had been separated at least four years. The correlation between their intelligence quotients was worked out by two methods, one of which we call double entry and other single entry. By the first method the correlation was .34 and by the second .25. When this entire group is broken up into two, according to the similarity of the foster homes in which they are placed, we find that in both cases the correlation between the intelligence of those in like homes is about 10 points higher than between those in unlike homes. By the double entry method, for example, the correlation between the intelligence quotients of those in unlike homes is only .19 whereas that for those in like homes is .30. The lessening of the similarity between siblings, then, by being placed in different homes and especially by being placed in unlike homes, appears to indicate that the similarity between siblings in general is due in considerable measure to similarity of environment and not wholly to heredity.

The obverse of this group is made up of children who are unrelated but who are reared in the same home. In some cases such pairs consist of an own child and a foster child and in some cases they consist of foster children from different parents. Since these pairs of children are not related there should be no more resemblance between them than is found in the average of the unselected population. In other words, the correlation between their abilities should be zero. For the largest number of pairs of such unrelated siblings in the same home, namely 140, the correlation between the intelligence quotients was found to be .34; in other words the correlation between the intelligence quotients of unrelated children in the same home is as great as the correlation between the intelligence of siblings in different homes. In the former case, as in the case of other comparisons which will be mentioned, there is a possibility that the resemblance was due in part to the fact that foster parents selected their foster children partly on the basis of their intelligence—in other words that there was an artificial selection of cases.

This was the chief technical difficulty to be met in the interpreta-

tion of our data, and I may consider it at this point. The trend of the evidence indicates that selection was responsible for very little of the resemblance which is found between the home and the child's intelligence. In the case of the children who were tested before placement, a correlation of .34 was found between their intelligence test score and the rating of the homes into which they were adopted. This correlation, by the way, was raised to .52 after the children had been in the foster home four years. This increase in the correspondence between the children's intelligence and the grade of the homes indicates that the homes have had an influence upon intelligence. The conditions favoring selections were at their maximum in the case of this group. They were given a mental test, whereas in over 80 per cent of the entire group no mental test was given before adoption. The administration of the mental test made possible a judgment regarding the child's intelligence. Moreover, it probably indicated an unusual interest in the child's intelligence on the part of the prospective foster parents. Positive evidence is not wanting that foster parents commonly lay stress upon other traits than intelligence in making their choice. Beyond this there is statistical evidence that selection could not have been a major factor in our group as a whole. When we divide the group into two according to the age of placement, we find 156 children who were placed before they were two years of age. The correlation between the intelligence and the home rating in the case of this group was .52, which is greater than that for the group as a whole or that of the group which was placed above two years of age. Finally, a group of 59 cases was found concerning whose parents practically nothing was known. These children, therefore, could not be selected on the basis of a prediction of their intelligence from their parentage. Furthermore, they were placed at the average age of two years and four months. The correlation between the intelligence of these children and the rating of their foster homes is .51. We may exclude an artificial selection of cases, therefore, as an important cause of the correlations which we have found.

I have already anticipated our next general comparison, namely, that between the intelligence of the entire group of children with the character of the homes in which they were placed. The rating of the foster homes was made by means of a first-hand study with the aid of a home rating blank. The correlation of this rating with the intelligence of the foster children was .48. Another way of determining the relationship is to calculate the average I.Q. of children in poor, average, and good homes. The number of children in these three groups was 101, 186, and 114 respectively. The means of the intelligence quotient of the children in these three grades of homes was, respectively, 88.9, 96.4, and 106.8. The difference between the means of the children in the poor homes and the good homes is 18 points in I.Q. This finding is reinforced by a comparison of the mean I.Q.'s of a group of 111 illegitimate children. These children, of course, were placed young and there could have been very little selection based on intelligence. The mean intelligence quotient of the groups in the poor, average, and good homes, respectively, was 95.6, 104.9, and 112.4. The

difference between the means of those in the poor and good homes was 16.8.

The resemblance between the intelligence of the foster children and the intelligence of the foster parents was also studied. The following correlations were found:

Between the I.Q. of the child and the intelligence test score of the foster father, .37.

Between the I.Q. of the child and the test score of the foster mother, .28.

Between the I.Q. of the child and the vocabulary score of the mid-parents, .36.

Comparison was also made between the I.Q. of the children and the occupational status of their foster fathers, based upon the Taussig classification. This correlation was .37.

We have been considering the intelligence of foster children in relation to the character of the foster home and of the foster parents. We may now consider it in relation to the character of the true parents of the foster children. Since we did not have exact scores or ratings on the true parents or on their homes it is necessary to confine our comparison to general measures applied to the group as a whole. Let us first get a rough picture of the characteristics of the true parents. We are provided with rough estimates of the intellectual and moral characteristics of the true parents of the foster children. Their intellectual status may be summed up by saying that 26 per cent* of the fathers and 51 per cent of the mothers of the legitimate children were judged by their observers as being mentally defective. For the illegitimate children, the percentages of the fathers and mothers who were judged defective were 4 and 25 respectively. The judgments concerning the fathers of the illegitimate children, of course, are very uncertain. On the side of moral character of those concerning whom we have reports, the following percentages are indicated as being defective:

Of the legitimate children, 63 per cent of the fathers and 32 per cent of the mothers.

Of the illegitimate children, 27 per cent of the fathers and 28 per cent of the mothers.

It is obvious that the heredity of these children is extremely bad both on the side of intellectual capacity and of moral character.

With these facts as a background, let us examine the general intelligence level of our entire group. We have taken children within the age limits which were included in the distribution given by Terman in the standardization of his scale and have compared the two distributions. The mean I.Q. of the children of the home group was 98.5 and that of Terman's group 101.5, a difference of only 3 points. It is highly probable that the mean I.Q. of this group would have been much lower if they had remained in the homes of their parents

* These percentages are based upon the cases for which records are available. There are records for the following percentages of the various groups: fathers of legitimate children, 80 per cent; mothers of legitimate children, 68 per cent; fathers of illegitimate children, 29 per cent; mothers of illegitimate children, 74 per cent.

and had not had the advantages of foster homes. The mean I.Q. of a group of 137 children who were newly committed to the society was calculated and found to be 88.6.

A group of 26 children was found, both of whose parents were reported to be feeble-minded. If intelligence is inherited according to Mendelian law, all of these children would be feeble-minded. Only four, however, had an I.Q. below 70. The average I.Q. of the group was 81. It is obvious that a favorable environment must have been effective in raising the intelligence of these children as well as of the entire group.

An examination was made of the school progress of the foster children. If we study the entire home group we find 11 per cent accelerated, 69 per cent normal, and 20 per cent retarded. Their progress, therefore, is very favorable, compared to children as a whole. If now we confine our scrutiny to those children who were placed in the foster homes before they were six years of age, we find that the per cent accelerated rises to 14 and the per cent retarded falls to 11. If we pursue our analysis still further and compare the children placed before two years of age in good homes, with those placed after five years of age in poorer homes we find a still more striking contrast. In the case of the children placed young in better homes the per cent accelerated is 23 and the per cent retarded, 2. In the case of those placed older in the poorer homes the per cent accelerated is 2 and the per cent retarded, 47. This gives striking evidence of the effect of the home environment upon the progress of children in school.

Some account was also taken of the behavior of the foster children so far as evidence on this point could be found. The interpretation of the facts is somewhat difficult due to the lack of standards of offenses and norms of frequency. However, it appeared that there were only 13 children out of the entire group of 401 who presented a serious problem difficulty. There were, of course, a larger number who were reported as presenting behavior problems, namely 32 in all. But it is not probable that this number is greater than would be found in a group of unselected children.

The correlations which have been reported are all based upon the I.Q. as found from the administration of the Stanford Revision of the Binet Scale. In order to rule out the effect of language and of cultural factors in the intelligence test score so far as possible, the International Test, devised by Dodd, was also used. Since no means of calculating an intelligence quotient is provided with this test, it is necessary to calculate the coefficients with the raw score and then parcel out age. This was done in the case of the more important comparisons. This procedure in general gives a lower coefficient than when the I.Q. is used. For example, the correlation was found between the mental age on the Stanford Revision and the home rating, with age constant, and it turned out to be .36, whereas the corresponding coefficient when the I.Q. was used was .48. The correlation between the score on the International Test and the home rating, with age constant, was .24. We may conclude from the preceding contrasts

between the two coefficients with the Binet scale that if some measure corresponding with the I.Q. had been used the coefficient between the International Test Score and the Home Rating would have been higher. There remains, however, a difference between the correlations of the two tests, and it may be said that the relationship between intelligence and the character of the home is less when a test of the character of the International Scale is used than when one of the nature of the Binet Scale is used. In other words, the ability measured by the International Test is somewhat less susceptible to the influence of environment than is the ability which is measured by the Stanford Revision.

The results of this study may be compared with the other study which is most like it, namely, the study of foster children made by Miss Barbara Burks under the direction of Dr. L. M. Terman at Stanford University. I will first point out the agreement between the two studies and then discuss the disagreement.

In the first place, the two studies are in agreement on the main technical problem, namely, the existence of selection among children who are adopted so as to produce a correlation at the outset between the character of the home and the intelligence of the children. Miss Burks investigated the possibility of the existence of such selection and came to the conclusion that it was either very slight or entirely absent. This conclusion was based largely upon a descriptive analysis of the usual procedure which is followed in adopting infants and of the requirements which are usually laid down by prospective foster parents in the selection of children. In our own study, as I have already indicated, we pursued the matter further by making a statistical analysis of various groups. We found that those groups in which a selection might be supposed to be possible yielded no higher correlation than did those in which selection seems impossible. The studies, then, agree that selection cannot account for any considerable share of the correlation between the intelligence of the children and the grade of the foster home.

In the second place, the studies agree in finding that the general level of intelligence of foster children is not inferior to that of children in general. The Stanford study furnishes even more positive evidence on this point than does the Chicago study. The average I.Q. of the children in the Stanford study is 107.4, whereas that of the Chicago study is 98.5. The difference is perhaps due to the fact that the children of the Stanford group were all adopted within one year of their birth. This gave them a longer period of residence in the foster home and excluded all cases of children who got their start in life in an inferior environment. It is possible also that the foster homes of the Stanford group were somewhat superior on the average to ours. Since we found that the parents in superior homes make it a practice to adopt children early, both of these facts would suggest that the superiority of the Stanford group was in part due to the fact that the environment operated earlier.

The third difference is that a large proportion of the Stanford children fall in the illegitimate group. Whether this indicates any-

thing concerning their native capacity, I am unable to say. We found that this group was somewhat superior to the legitimate children, but an analysis of the data showed that this superiority was to be attributed in the main to the contrast in the environmental conditions in which the two groups had lived.

While the studies agree in finding the average intelligence level to be at least as high as that of children in general, the interpretation given to this fact differs. In both studies the fact is interpreted to mean that the home has raised the level of the children's intelligence quotients above what it would otherwise have been. However, they differ somewhat in the amount of difference which the home has made. Miss Burks estimates that her group of foster children would have had an I.Q. of one or two points above 100 if they had remained in their original homes. Our estimate is that the I.Q. would have been from 10 to 15 points below 100 if the children had grown up in their own homes. All the studies which have been made of the comparative intelligence of either adults or children in poor environments have shown that the average intelligence quotient is from 10 to 15 points below 100. The orthodox interpretation of this fact on the part of those who emphasize heredity is that this low average is the expression of the low native capacity of persons living in poor surroundings. Whether the low standing is due to deficient native capacity or to some other cause, the fact that the standing is low can hardly be questioned. It seems reasonable therefore, to conclude that these foster children would have grown up with low average I.Q.'s if they had not had the benefit of superior homes.

The third point of comparison is the correlation between the intelligence quotients of the foster children and the grade of their foster homes. The correlation coefficient in the Chicago study is .48. In the Stanford study the correlation between the intelligence of the children and the environmental factors when the coefficient is corrected for attenuation is .42. This coefficient is somewhat lower than that found in our own study. The difference is exaggerated by the application of the correction for attenuation in the Stanford study. Even making allowance for these differences, however, I think we are justified in saying that both studies show a substantial relationship between the child's intelligence and the character of his home. Under the circumstances this correlation cannot be due to heredity and must therefore be due to environment.

I may make a concluding remark concerning the method of path coefficients which Miss Burks used to determine the share of the various factors in the intelligence of the children of the control group. This method is a substitute for the method of partial correlation. It has for its purpose the disentanglement of various causal factors in the production of a common or joint result. In the present instance the joint result is the I.Q., and the common factors which we wish to disentangle are heredity as measured by the intelligence of the parents and environment as measured by the character of the home. Miss Burks estimates that the contribution of parental intelligence is 33 per cent, and that the contribution of environment other than parental in-

telligence is .0013. The remainder she attributes to remote heredity in contrast to parental intelligence.

Concerning the mathematical or statistical soundness of this procedure I am not prepared to judge. I wish to remark merely that it is an indirect procedure and, in this particular case, that it gives results which are highly divergent from the more direct estimate of the contribution of environment in the case of the group of foster children. As I have already remarked, the correlation between the environmental factors and the intelligence of the foster children was calculated to be .42. Miss Burks calculated that the contribution of environment to intelligence is represented by the square of this number, or .17. If we accept this procedure, which again has not been proved to be the correct one, we still get a discrepancy between the two estimates. The share of environment in the case of the foster group is calculated to be 17 per cent, and in the case of the control group to be .0013.

In view of this discrepancy, then, and of the somewhat uncertain character of the highly indirect statistical calculation it seems to me that we are bound to lay more stress upon the simpler and more direct statistical facts. The simplest and most direct of these is the general intellectual level of the foster children. This taken together with the various types of correlation, the great majority of which are consistent in indicating the importance of environment, must bring us to conclude that our evidence indicates beyond question that so far as we can measure intelligence by our intelligence tests, it is affected to an important degree by those intellectual and social factors which are bound up with the home.

Measurement of Vocabulary

EDWARD L. THORNDIKE, Professor of Education and Director of the Division of Educational Psychology, Institute of Educational Research, Teachers College, Columbia University

[Due to the fact that Dr. Thorndike's copies of his addresses were lost at the time of the Conference, his address on the Measurement of Vocabulary cannot be published in this bulletin.]

Preliminary Report on the Evaluation of Certain Practice Pads in Arithmetic

WENDELL W. WRIGHT, Associate Professor of Education, Indiana University

[This paper was a report of an evaluation of seven different types of practice pads in arithmetic as shown by their use in the fourth and sixth grades of eleven school systems. The study was not complete at the time this report was given, and will appear in the fall of 1928 in a Bulletin of the School of Education, Indiana University.]

Measuring Changes in School Bond Prices

HAROLD F. CLARK, Professor of Education, Indiana University

EVERY year about $300,000,000 worth of school bonds are sold. Is it important that they be sold to the best advantage so that adequate school houses, playgrounds, and school equipment can be provided? In other words, Do the schools need to obtain their capital outlay money advantageously? To ask the question is to answer it in the affirmative. If it is necessary to sell school bonds wisely, then it is necessary to know something of the changes in school bond prices.

According to the best estimates available, the average interest rate on all school bonds outstanding is 4.66 per cent. There are hundreds of millions of dollars' worth of school bonds carrying 5 per cent interest or more. If an index of school bond prices had been available when these bonds were issued, it would have shown the necessity of inserting a callable feature in the bonds so that later the bonds could have been called and re-issued at a lower interest rate.

Many school boards do not know within 1 per cent what interest rate school bonds should carry. During the past month school bonds of very sound districts have been issued carrying 5.5 or even 6 per cent interest. Sometimes the school district gets a part of this back in a higher premium, but it is highly improbable that all of it is returned by this process. And sometimes little or no premium is received, even with these high interest rates, when the bonds are issued by financially sound school districts. If an index of school bond prices did nothing else, it at least would enable school boards to know what was the current rate of interest being paid on school bonds. This alone should produce enormous savings to the school boards of the country.

School bond prices change. How then can such changes be expressed in a form simple enough that the school man can use it? There have been developed for us index numbers or measuring devices for wholesale prices, for wages, and for many other things. The Bureau of Labor Statistics alone gives index prices for 550 commodities. We have such indexes in the general financial world; indexes of stock market prices, of bond prices, interest rates, and other items being available. For a long time there has been a pressing need for an index of school bond prices.

How could such an index of school bond prices be made? First, it would be necessary to get a record of all school bonds sold in the United States. The important thing is the interest rate and price paid so that the net interest rate can be calculated. It is easy to obtain the amount of the sale for most sales and very easy to obtain complete details for the larger issues. The financial journals and ordinary papers will carry notices of most of the issues. But if no other issues were included, the small place, which it is very important

to include, would be left out. This necessitates making special provision to get information about school bond sales of small communities.

After the net interest rate has been determined, the next thing is to weight the issues according to their size. This gives us the weighted net interest rate for all school bonds sold during the period under discussion. If this is calculated each month we have a weighted index number of school bond prices. However, it is not enough to guide the school man in issuing school bonds to have the index of interest rate alone. He should have supplementary information to go with the index. The following information is being supplied each month* along with the index of net interest yield:

"I. Present facts and conditions.

1. Average yield of all school bonds sold during the month. This shows the school official immediately what is the prevailing rate of interest on school bonds, and would call for an explanation if the rate on a proposed issue were much higher. It is an approximate norm by which the school bond rates can be judged.

2. Miscellaneous factors on school, municipal, and federal bonds.

a. School bonds sold during the month.

b. School bonds sold during the year to date.

These two items enable the school official to judge what others are doing in regard to issuing school bonds.

c. All municipal securities sold during the month.

d. All municipal securities sold during the year to date.

By enabling the school officials to make comparison between total school and total municipal issue, additional light may be thrown upon the desirability of issuing school bonds at this time.

e. All school bonds outstanding (estimated).

(Estimate may be in error by as much as $250,000,000.)

f. Average yield of all school bonds outstanding.

Two items that must be estimated, inserted for purpose of comparison with amounts now being issued and current rate.

g. Yield of bonds of ten large cities sold during the month.

This is a very valuable item for comparison.

The larger cities should try to keep their interest on school bonds as much under this as possible.

h. Yield of United States long-term bonds.

This furnishes a rate to be striven for in issuing school bonds. A school issue cannot go below this except for some local and probably temporary cause. Even then it will probably be partly due to the ignorance of investors as to the net yield to be obtained from government bonds. An occasional issue has sold below this point in the past few months.

"II. Past facts.

1. Bond sales, school, municipal, all public and private, and rate of yield for several years past. Valuable in indicating the approximate interest rates school bonds should carry.

* In the *American School Board Journal.*

2. Average yield of long-term federal government bonds. This is a good measure of a pure interest rate, the interest obtained on money when little or no risk is involved. It is the lower limit of interest to aim at when selling school bonds. When this rate drops the interest rate on school bonds should drop.
3. Security prices. The price of stocks and bonds in general should be of advantage in helping the school official estimate the probable trend of school bond prices.
4. Index number of wholesale prices, of all commodities and building materials. Changes in wholesale prices are important in throwing light upon probable changes in business and bond prices. As a major portion of a school bond issue is spent for capital outlay, the price of building materials is an important consideration in determining when to issue school bonds.

"III. Future trends.
1. What the facts show. Certain formulas are being worked out based upon the factors that have predicted changes in school bond prices in the past. These formulas will be used to make predictions regarding the trend of school bond prices in the next thirty, sixty, or ninety days.
2. Opinion and advice. In this section the predictions from the above formulas will be modified in the light of all available current financial data and an opinion given as to the probable trend of school bond prices. From time to time practical suggestions will be made in regard to improving the financial procedure of schools, particularly as it relates to bonds."
(The above factors are being supplied with the index at the present time.)

The additional factors with the index of school bond prices should enable the school man to sell school bonds with much better results.

What kind of facts would we expect such an index to give to the school man? Some of the facts are mentioned below. A year ago no one knew exactly what was the price of school bonds, nor did anyone know in more than a general way what was the prevailing net interest rate on school bonds. For several months past, we have been making, and there has been published each month in the *American School Board Journal*, such an index. From the index one can see at a glance that last September school bonds sold to yield 4.58 per cent; in January of this year the price of school bonds had changed so that the average school bond carried only 4.29 per cent interest. By the first week in April there had been a further change so that the average interest rate on school bonds was only 4.02 per cent. As we hope to show later, all the factors point toward even lower interest rates.

We have calculated the average rate of interest on school bonds for each month for the past year. As an illustration let us take the month of March. In 1928, the average yield on the price of school bonds sold in March was 4.18, the lowest average interest rate since long before the War. The rate in March, 1926, was 4.73 per cent; in March, 1924,

the rate was 4.92 per cent; in March, 1922, the rate was 5.00 per cent; in March, 1921, school bonds sold on an average interest rate of 5.79 per cent, the highest interest for many, many years. In March, 1920, the rate was 5.43 per cent. We could go on back the same way for any month. With such a table giving the interest rates of school bonds for each month before him, the superintendent is in a position to issue school bonds much more intelligently than he can at the present time. The table showing the interest rate of school bonds is included along with other material with the index of school bond prices.

The amount of the bonds sold each month is given along with the average interest rate at which school bonds were sold. We shall give the sales in March for a few years for purposes of comparison. In March, 1928, $18,854,360 worth of school bonds were sold; in March, 1926, $19,439,400; in March, 1924, $14,170,587; in March, 1922, $14,012,641; in 1920, $4,381,250; in 1910, only $2,243,550 worth of school bonds were sold. You see the growth, 2 millions in 1910, 9 millions in 1920, and 18 millions in 1928. Of course these figures mean little without figures showing the growth in volume of other kinds of bonds, stock, and in general financial activity. Time prevents us from giving the other figures in the discussion.

Along with the national index of school bond prices we have been developing a series of state indexes. General interest rates vary somewhat among the different states. Whether that variation is enough to account for the difference in the state indexes of school bonds is not definitely determined yet. This is a problem on which we are spending a great deal of time at present.

Altho the national index of school bond prices should be of great value to school men, the national supplemented by the state indexes should be of much greater value. The state indexes will give the average net yield of all school bonds sold in any state in the Union during the previous month. During a recent month, for instance, we find the state indexes varying all the way from 3.69 in Massachusetts to 5.91 in Florida. This means that the average net interest on all school bonds sold that month in Massachusetts was 3.69 per cent while the same month Florida school districts paid on the average 5.91 per cent interest on school bonds.

The regular school bond index is an index of the price of long-term school bonds. The schools of the county each year borrow millions and tens of millions of dollars for short periods. In the past they have had no guidance as to what rate of interest should be paid on these short-term loans. School boards do not know whether short-term loans should carry a higher or lower rate of interest than long-term loans. For that reason we are developing an index of short-term loans. It shows very definitely that school boards should be paying less for short-term loans than they are paying for long-term loans. The opposite is usually the case. The small place usually pays a higher interest rate on the short-term loan than on a long-term loan. This is contrary to the commercial rates on such loans, and the information in our index should enable school boards to make substantial savings on their short-term borrowing.

Each month along with the index have gone certain suggestions regarding issuing school bonds which have grown out of a study of the index.

What advantage should the above information be to school men?

A review, however superficial, of the record of school bond sales for the country as a whole or for almost any part of it will reveal the fact that no scientific program of issuing is being pursued very generally. Bonds are offered on a "hit or miss" plan at any time of the year without regard to the condition of the money market. The practice of the best financiers does not set such an example. In his treasury report of the year ended June 30, 1925, Secretary Mellon writes:

"The Treasury knows with substantial accuracy how much of the debt should be retired each year and how much should be refunded, with a varying margin of possible retirement or refunding. It also knows how much of the debt ultimately should go into long-term bonds, and how much should be turned over in short-term obligations. The determination of the character of the securities to be issued depends, then, on the maturities which are desirable from the standpoint of the Treasury, and upon the cost of the different types of financing. This fixes the character of the issue, whether certificates of one year or less, notes up to five years, or bonds up to any maturity or a combination of any of these issues."

Writing further he says:

"The yields on outstanding Government securities move in harmony with prevailing interest rates and are controlled by the same general forces.

. . . . . .

"The factors which the Treasury must take into consideration in floating a new issue of securities are practically the same as those which must be considered by an investment banker in floating new issues for his clients. All government offerings are made on a strict investment basis. The Treasury always aims to sell its securities at the lowest possible interest rate consistent with their successful distribution among investors, and, with this in view, it always gives close attention and consideration to the market quotations on outstanding securities and to prevailing money-market conditions in connection with the determining of the amount and terms of these issues. The Treasury wishes to secure the lowest rate that the market will offer."

In other words, the Treasury Department watches the money markets, studies the influencing factors, and anticipates the movements. Then if money is needed and conditions are not favorable for issuing long-time paper, the department borrows the amount needed for the length of time it expects to elapse before a favorable time.

Smaller businesses in all probability do the same thing; there is no reason why the school man should not. How successful he may be—what he may be able to save of the public money, remains to be seen. This study has attempted to raise a few questions and to make a few suggestions for his consideration and use.

The superintendent should be aware of any seasonal changes in money rates and bond prices and be prepared to take advantage of them in issuing school bonds. Lagerquist shows the importance of this when he says:

"The best seasonal indicators of the New York money market are those items which are most responsive to quick changes, namely, call loan rates, very short-time loan rates, and the ratios of reserves to deposits. Time loans and bank clearings, according to Professor E. W. Kemmerer, while less susceptible to minor influences, mark more accurately the broad swings of the market, but they are unsafe indicators as to the beginning and ending of the seasonal swings. The reader should always be careful in his study of the items just stated not to confuse their seasonal movements with the movements primarily based on the contraction and expansion of credit over a long period. The tendency in the decrease or increase of interest rates and ratios of loans to deposits and of reserves to deposits in the long-period movements can usually be anticipated, but they are not regular in occurrence; their seasonal movements, on the other hand, are fairly constant in repetition, but do not anticipate coming changes of an enduring character in the market. However, if over-expanded credit has accumulated over a 'long-period swing,' and exists during the autumnal seasonal swing, the strain is greatly intensified.

"As further pointed out in Kemmerer's congressional report in discussing the seasonal swing of the calendar year, there is a decided easing of the money market in January, which extends into February, usually making a 'cheap money' market at the end of January and the beginning of February. The reasons for this first movement are: the subsidence of crop-moving demand and the consequent return of cash to New York, the relatively small amount of freight traffic, and the large amount of exports in January. The second seasonal swing usually begins somewhere between the middle and the last of February and extends into April. This second upward movement can be chiefly attributed to the demand for cash for spring planting, the renewed building activity, the payments of obligations and interest, and a minor movement of cash payments to New England manufacturers. The third seasonal swing extends from the close of this former period to the middle of June or early July and is due to the influence of foreign trade, the decline in money rates and the movement of money to New York, and the discount in trading made in anticipation of the fall demands. The fourth movement, marked by the first crop movements, is anticipated by an upward swing of call rates and a lowering of bank reserves and an increase of the ratio of loans to deposits. This period proceeds into a fifth movement which is largely a continuation of the fourth, but with a more decided upward trend about October first, which continues well toward the end of the year. The chief cause of this last movement is the demand for cash to move the crops and is sustained by the trade activity of the holidays. . . .

" 'The season effect on bond prices does not cause them to move consistently, or regularly. Also, individual prices may not fluctuate very

much, but collectively for the year these fluctuations extend into millions. Bond prices tend to increase in January under the stimulus of an easy money market and to decline quite steadily till the climax of the second swing. With the beginning of the second weak seasonal market, bond prices normally rise to their highest point in early summer. From the first of June until the first of September, bond prices normally take their first pronounced downward move and continue even more steadily until the middle of November, when they tend to move upward following an unsteady advance during December.'"

Chamberlain, writing on the relation of bond prices to the condition of credit, says:

"As related to bond prices, the argument of the business cycle amounts to this: The prices of current, high grade, listed bonds (and of other bonds in their degree) depend on the condition of general credit. The proof of it is strikingly shown by a chart, which shows that the average price of the ten bonds with which we have been dealing varies inversely as the ratio of loans to deposits in the national banks of the United States. This statement may seem difficult of understanding at first, but the fact is very simple.

"The national banks of the country are the clearing-houses of commercial and personal credit. Loans represent the demand for, and deposits represent the supply of general credit. The ratio of loans to deposits, therefore, is the ratio of the demand to the supply of credit; it is the index of the condition of credit. High ratio means necessity for liquidation by borrowers; low ratio, power for accumulation. These statements hold in spite of the fact, already noted, that the shifting of a bank's customers from the credit to the debit position may be accomplished without corresponding bookkeeping loss in the item of deposits. The weakened position may show more in the loans.

"When borrowers must liquidate, the prices of all things purchasable that have a national market must fall. The fall may be delayed so long that the cause is obscured; but sooner or later it must come. Therefore, a high ratio of loans to deposits means low prices for bonds, stocks, and commodities in general; and the effect of high prices is usually felt in this order for reasons outlined in the pages immediately preceding.

"But bond prices have a much more intimate relation to credit than do either stock or commodity prices. Bonds, themselves, are credit instruments for loans, and such bonds as are chosen for graphic study here are long-term credit instruments. High grade as they are, and listed, and fairly active on the principal exchanges, they respond quickly to alterations in the condition of credit; their movements are less hampered by extraneous circumstances, are little affected by fears for the safety of interest, or principal at maturity.

"The financing of the bond business, and of bond speculation in general, is another aspect of the same relationship between prices and credit. When credit is cheap, bonds may be bought and carried on loans that will cost less than the income or interest from the bonds. Bonds will therefore be in demand for the sake of this difference and the logical appreciation which this difference should cause in the long

run. When there is no profit in thus carrying bonds, speculative holdings will be liquidated and bond prices will fall."

As stated before, there are local conditions that must be considered —these in fact may prove the most important influences—but it must be borne in mind that New York markets are widely felt and that the small companies, banks, etc., very rarely indeed take up bond issues. Nevertheless, specific studies for each district must be made before anything like accurate information can be furnished concerning the time to sell school bonds in that district. The condition of industries, building and other booms, climate and crop planting, harvesting, and moving are factors which may greatly affect the supply and consequently the price of money. In this, as in every other case, each community must face its own peculiar problems in addition to and regardless of general nation-wide conditions.

The question arises now as to the actual savings that may be effected by a widespread program of careful selling. It is possible that the small school which does not have extensive building plans will not consider the savings of sufficient amount to warrant careful sales planning or a change in building plans. School men say with reason: "We must build when we can get enough enthusiasm aroused to support our programs." And even in the large cities the same difficulties are found, caused by political muddles and a varity of other things. In anticipation of such objections and the more frequent one that it is not profitable to sell when the market is favorable only to hold the money idle until time for its use, this answer is given: It is not a case of waiting or accelerating six months, or even two months; it is a matter of days. Two weeks may make a great difference if the issue is at all large and extends, as it usually does, over a period of from ten to fifty years. Besides, the example of the United States Treasury Department may be followed, money being borrowed for a short period until the time is ripe for issuing long-term bonds. The problem is certainly worth figuring on whatever the size of the issue or the length of time over which it is to run. Large cities that have a dependable and continuing program of building and repairing should be especially interested in studying market conditions before their bonds are offered.

The purpose of this study is not to determine finally the best date to issue school bonds but to point out that there is a problem of determining the best time to issue school bonds. One time is not as good as another. This study points out periods in which bonds should not be issued in the average community. Detailed study should be made of particular types of communities to determine the best date in any particular kind of community.

The final question is, of course, When should and when should not the school man issue bonds? As yet there is no very satisfactory answer, and there will probably never be an answer fitting all cases; there are too many contributing factors. But in general it seems safe to say that bonds should not be issued in the month from the middle of December to the middle of January.

There are also other periods in which it would seem advisable not to sell in normal times. These are, as suggested earlier in the quotation

from Lagerquist, in the early spring from near the middle of February until some time in April, and during the period of steady rise from September or October on thru till the end of the year. The months May, June, July, and August are, together with the low period from the middle of January to the middle of February, other things being equal again, the most advisable time to sell school bonds. The question of the more or less regularly recurring, long period swings has not been considered in this paper and will be only mentioned here. It is sufficient to say that the influence of these movements can and must be discounted or at least considered if the prices are to be anticipated.

Our only hope is that by this attempt which we are making each month to measure changes in school bond prices we will enable school men to sell school bonds more favorably and thereby enable the children of the country to have better schoolhouses, playgrounds, and school equipment. If you do not see the index of school bond prices each month as it is published in the *American School Board Journal* we shall be glad to give you at any time the results of our attempt to measure changes in school bond prices.

4—13402

The Psychology of the School Dictionary

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THE dictionary is one of the most important instruments of instruction. It offers an enormous store of systematized knowledge, more or less of which is useful to every pupil. We can hardly realize the saving of time and error made by this great invention of past scholarship. Still less, perhaps, do we realize that a dictionary ranks high in satisfying two ideals of our most modern theory of education, namely, that the instruction given be in response to a real need felt at the time, and that the pupil be taught to do something which would be a reasonable thing to do in the real world. A pupil uses a dictionary when he really wants to know the meaning or pronunciation or spelling of a word. He can do just what would be the reasonable thing to do in a similar case in the real world outside of school.

School dictionaries are also in some respects greater sinners against psychology and pedagogy than any other instruments of instruction. So, both because of their values and their vices, their improvement should be one main task of educational science. Yet they have been almost unnoticed by all the educational reformers of the century past. The Herbartian doctrine that the new knowledge or insight or habit should be taught with the optimal use of the experiences already undergone and abilities already acquired and knowledge already present could have been applied directly and helpfully to the definitions of rare words by common, and unfamiliar words by familiar words; but no follower of Herbart used the doctrine to remodel dictionaries.

The so-called child study movement which, especially from about 1890 to 1910, studied the concrete details of child life with a view to fitting education to the natures and needs and interests of children, criticized and sought to change school materials and methods in hundreds of ways, but seems never to have inquired concerning how well school dictionaries were adapted to children's minds.

The recent studies which emphasize the psychology of learning have established facts and principles which are changing teaching and textbooks in reading, arithmetic, and spelling in fundamental ways, but so far they, too, have neglected the most-used textbook of word knowledge.

It is instructive to apply psychology and educational science to the problems of the school dictionary, not only because of the improvement and economy in learning which may result, but also because certain general principles of textbook construction are thereby clarified and emphasized. For the school dictionary, in its presentation of the meanings of words, is the extreme case of the modification of elaborate scholarly knowledge for presentation to children. In what follows we

shall consider dictionaries chiefly as teachers of the meanings of words. We shall also limit ourselves to dictionaries used in elementary school and junior high school, or thru grade 9.

A great dictionary is a masterpiece of science and scholarship, and also of system and organization, condensing the experiences of millions of hours of reading into pithy epitomes and apt illustrations of a word's meanings. It is a treasure-house of conveniently arranged information for an educated adult. The school dictionary, which is made out of it or adapted from it, valuable as it is, does not perform anything like a corresponding service for the twelve-year-old pupil. The reasons for this comparative failure are instructive. One is that the child's book is made too small. It is a general tendency in the adaptation of books for school use to shrink them up. A history of the United States in four thousand pages is cut to four hundred; a hundred-thousand-word discussion of heat or light or electricity or wages or banking is made into a chapter of five thousand words. Reducing the number of facts and principles to be taught is certainly desirable. But it will usually require many more words and pictures and diagrams to teach the same fact or principle to the immature and untrained and uninformed pupil, perhaps four times as many. If dictionaries for twelve-year-olds are to be, as they are, about one-fourth the size of dictionaries for adults, we should then need to reduce the number of facts presented to about one-sixteenth as many as are in the large dictionary. No such proportionate reduction is made.

The custom of making small books for small pupils shows its irrational associations beautifully in the case of type. This, too, is small, so small that it would be tolerated in no school textbook save a dictionary, tho the work of looking up words and learning their meanings is such as should be relieved of all unnecessary strain.

The reductions by omitting words altogether are in general suitable, just as in the adaptation of college books to the lower schools the omissions of entire topics are usually reasonable. The reductions by omitting certain of the rarer meanings of a word are less so, and the reductions by condensing the treatment of any one meaning are often very unreasonable.

This indeed is where so many of the makers of school books have disregarded the laws of psychology and teaching. They keep a general fact or principle, omitting or reducing the explanations and illustrations of it, and the fact or principle thereby becomes incomprehensible to children. They keep a man's name and the bare fact of his chief activity, but omit all the details about him and it which enable a pupil to make him and it real and vivid and fix them together in memory. In the case of the dictionaries, they omit the pictures and illustrative sentences containing the word, leaving the bare definitions, tho the child needs the picture and illustrative sentence more than the adult, and needs two or three of them where one would serve for the adult. The treatment of any one word-meaning in a large dictionary is already condensed to the limit of comprehensibility. The modifications which are needed in adapting the treatment to children are all in the way of *expansion* by repetition, illustration, and the replacement of unintelli-

gible characterizations and definitions by simple cases of actual use where the context teaches the meaning.

Consider the following case. The common school dictionary has: "*battlement*—an indented parapet surmounting a wall." If we turn to "indented," we find: "*indent*—to notch; to bend out by indenture or contact; to begin (a line of print) further in from the margin than the rest of the paragraph. To be notched; to crook or turn; to wind in or out." If we turn to "parapet," we find: "*parapet*—wall or rampart covering soldiers from attack; breastwork; low wall protecting the edge of a bridge, quay, etc." If we turn to "surmount," we find: "*surmount*—to rise above or higher than; to surpass; to subdue." The pupil would probably be so discouraged by the unintelligible "indented parapet surmounting a wall" that he would give up the chase.

Now why do we have this cryptic definition when a picture of a battlement is so much the better way to teach a child what the word means?

Let us turn to the next larger sized dictionary of the same author. We there find: "*battlement*—a parapet, with open spaces at the top of ancient fortified buildings, later used as a decorative feature."

In the main dictionary we find: "*parapet*—consisting of alternate solids and open spaces, surmounting the walls of ancient fortified buildings. At first purely a military feature. Afterwards copied on a smaller scale with decorative features, as for churches,"—accompanied by a picture.

The process of modification as shown here is typical of the errors which the scholar makes in presenting facts to children. He does not fully consider the mind of the learner or the response he wishes to produce. If he had, he would have saved the picture rather than any of the text, and would have simplified, improved, and properly labelled it.

He was not careful rigorously to avoid defining what he is trying to teach by something still harder to learn; and he was possessed by a passion for adaptation to children via abbreviation. Otherwise, he would not have wavered between "at the top of" and "surmounting" and would not have replaced "consisting of alternate solids and open spaces" by "indented."

Sometimes the passion for brevity results in a statement which tells almost or quite nothing which would be of any interest or helpfulness to a pupil. For example, suppose that a pupil in the backwoods reads "banana" and does not know what it means and looks in the dictionary and finds, "*banana*—a species of plantain tree, and its edible fruit." His last state is probably worse than his first. This is the adaptation of the following: "*banana*—a perennial herbaceous plant native of all tropical countries; also its edible fruit. The banana has a soft herbaceous stalk similar to a tree trunk with very large simple leaves. The flowers are enveloped in colored bracts, the whole flower cluster forming a large pendent bunch. The fruit is five or six inches long and more than an inch in diameter. The pulp is soft and luscious, seedless through long cultivation. It is eaten either raw or cooked. Hundreds of named varieties exist, but those exported to northern markets are of two types, the yellow and the red. See plantain, dwarf banana." Picture.

The picture, "five or six inches long," "soft," "seedless," "eaten raw," "yellow and red," "growing in tropical countries," which might be made into intelligible items to give at least a partial knowledge of a banana (needless to say, the fruit, not the tree, should be primary in a child's dictionary) are all discarded. What the definition given does contain for the child, that a banana is a kind of tree and fruit, is obscured by "species of plantain."

Another common error of the scholar is to confuse two meanings of "true" and to underestimate one kind of truth for children. A true statement may be one which cannot mislead you if you understand it, or it may be one which will not mislead the person to whom it is made.

Compare, for example, these two definitions of "candle": (*A*) "*candle*—a cylinder of combustible substance inclosing a wick to furnish light," and (*B*) "*candle*—a piece of wax or tallow with a wick, which gives a light when it burns is a candle. When people do not have gas or electric light, they use lamps and candles."

"A" is the dictionary-maker's definition, and is the truer in the former sense, but "B" is probably truer in the latter sense for children ten to fifteen years old. They would probably get more truth and less error from "B" than from "A."

The use of pictures in dictionaries also illustrates a general error of textbook makers. They often write the words, leaving the pictures to be designed by an illustrator, who is often rather a decorator. They may even permit him to choose what matter shall be illustrated. Thus we have in arithmetics more or less attractive pictures of children, grocery stores, and such like which could almost as well be in a geography book. In dictionaries we have whole pages of flags, or birds, or ships, added as a sort of decorative bonus, but find no picture of an eagle where the word is, nor of schooner where the word is. There are far too few simple sketches and diagrams, and the pictures in general are decorations or additions rather than organic parts of a teaching plan.

If the scientific student of psychology and education criticizes the present school dictionaries as instruments of instruction, it is fair that he should be required to show just how they can be made better. This should be an attractive problem to him—the problem of planning a book by the use of which pupils in grades 5 to 9 can increase their knowledge of the meanings of words—and the consideration of it should be profitable to all teachers of the language arts, since each of them not only uses dictionaries as instruments of instruction but is also a living vocal dictionary.

As a first problem, take the selection of words to be taught and the selection among the different meanings where a word has several. Many criteria could be used for this purpose. The best of them would approximate toward a ranking of word meanings for the frequency with which lack of knowledge of the word meanings hinders the pupils in reading and understanding what is good for them to read, and a selection beginning at the top and extending down this ranked list to a point where the inclusion of the word did more harm by making the dictionary hard to use than it did good by its information. The commonest meanings of the two thousand leading words of the Thorndike list may not

need to be defined except to identify them for spelling, since pupils who have reached grade 5 know them.* Words much beyond the twentieth thousand are of doubtful value, their occurrences in the reading of our group being extremely rare. It would almost certainly be an economy to treat them in a separate volume to be consulted in the very rare cases when a pupil did not find the word which troubled him in the main volume. It is even a question whether time would not, on the whole, be saved by planning for two divisions, one to contain about twelve thousand words, the other to contain about eighteen thousand, both to be intelligible to children, but the level of intelligence and knowledge required to use the latter being somewhat higher.

Pictures and diagrams should be used in accordance with the rule that the best way should be taken to teach the meaning, the time and training of the pupil far outweighing the added cost of manufacture. Inspection of a thousand words taken by chance from twenty thousand promising candidates for inclusion in a dictionary for grades 5 to 9 will show that a picture or diagram or map is desirable with about one in ten of them.

Ideally the discussion of any word x should be in words which the pupil who seeks the meaning of x knows. This ideal cannot be realized, but we can try to use in the discussion of any word only words which are in general commoner and more likely to be known than it itself is. For example, a word in the tenth thousand of the Thorndike list should (except for reasons of weight) be defined or explained by words which are in the first nine thousand.

The operation of this one rule would add enormously to the value of school dictionaries. It would put an end to a very large fraction of the unitelligibilities which now baffle children, and destroy their interest in using the dictionary, such as:

"*camel*—a large Asiatic and African ruminant quadruped.
"*nickel*—a hard malleable, ductile metal of the iron group, resistant to oxidation.
"*ignorant*—destitute of knowledge.
"*kangaroo*—a herbivorous leaping marsupial mammal of Australia and adjacent islands. See mammals, Illus.
"*windpipe*—the trachea.
"*octave*—an interval of eight diatonic steps.
"*abscond*—to depart clandestinely.
"*ant*—an emmet; pismire."

A corollary of the rule would be the abolition of definitions in a circle, such as "*fatigue*—labor, toil, weariness." On looking for "labor" we find "*labor*—work, toil, labor with pain and fatigue." On looking for "toil" we find, "*toil*—labor with pain and fatigue." On looking for "*weariness*" we find nothing, it being unlisted. The following will emphasize this matter:

* In some cases the common meaning may serve as a useful introduction to the rarer meanings.

"*bean*—the seed of any certain leguminous plants, as, the common white bean.

"*leguminous*—pertaining to, or of the nature of legumes, as peas, beans.

"*legumes*—fruits or seeds of leguminous plants.

"*beak*—the bill or nib of a bird, or of some other animals, as the turtle.

"*bill*—the beak or nib of a bird.

"*nib*—a bill; beak.

"*blast*—a violent gust of wind.

"*gust*—a sudden blast of wind.

"*allowable*—permissible.

"*permissible*—allowable.

"*burdensome*—oppressive.

"*oppressive*—unreasonably burdensome.

"*felony*—any of various crimes more serious than misdemeanors.

"*misdemeanors*—crimes less than felonies.

"*disapproval*—disapprobation.

"*disapprobation*—act, state, or fact of disapproving; disapproval."

Every conscientious dictionary-maker, of course, seeks to avoid these circular definitions, but without some systematic protection against them, they are sure to creep in. Bravery is courage, and courage is bravery. Animosity, hostility, rancor, enmity, and malignity define one another until the ordinary pupil would give up the chase and a conscientious pupil might well weep.

If a definition of a word cannot be given save in words which the inquirer will probably not know, it is far better not to give a definition, but to take the necessary effort to devise illustrative sentences in which the context reveals the meaning.

We may hope by such illustrative sentences to provide something more instructive for children than, for example, the following:

"*substance*—that which underlies all outward manifestations.

"*quality*—a property, characteristic, or attribute.

"*quantity*—the being so much with reference to a possible more or less.

"*relation*—state of being related or referring; state of mutual or reciprocal interest."

In general, such illustrative sentences should be used very often to supplement and replace definitions. Sometimes it is easy to find useful ones. "When you sing *do re me fa sol la ti do*, you sing the notes in one octave"; or, "She sang a note, then she sang one octave higher"; or, "These two notes are an octave apart," would help out "an interval of eight diatonic steps." Sometimes it is hard. Thus it will require study and perhaps experiment to frame sentences to identify and describe "naptha" well, tho we may reasonably hope to do better than "a volatile inflammable petroleum product between gasoline and benzine," a definition which sounds suspiciously as if the dictionary-maker did not really know what naptha was and cribbed a definition out of a chemistry book.

It requires not only a sound psychology, but also great inventive skill, to find or frame sentences that lead pupils inevitably to the right meaning for a word. I cannot show you perfect products of the sort desired, but I can illustrate the process, by taking sentences from dictionaries now in use and showing how to improve them.

Consider the following: "*avenge*—to require satisfaction for injury; as, 'Time avenges.'" This is bad because time is not at all a typical avenger, nor do we think of anybody as injuring time, nor of it as requiring or obtaining satisfaction. (To obtain or get satisfaction, by the way seems much better than to require satisfaction.) A living creature will be better than time, and preferably one whom the pupils have learned to think of as seeking vengeance. The best I can think of now is an Indian. We also wish to make the getting of satisfaction clear, and to distinguish "avenge" from "punish for," so, "The Indian avenged the murder of his brother by killing the sons of the murderer."

Consider this: "*abed*—in bed; as, 'The sluggard is still abed when the sun is high.'" We can gain materially by having it a boy or a girl, or a man or woman, rather than a sluggard. But we can make assurance doubly sure by putting in bed the sort of person who belongs in bed. So, "The girl lies abed because she is ill," or even, "The girl lies abed because she is too ill to sit up."

Consider this: "*blazon*—display; as, 'A drunkard's face blazons his character.'" Unfortunately a drunkard's face does not always show his character, certainly not in the glaring way that "blazon" denotes. Consequently, this sentence does not blazon the meaning of "blazon." "Wilson's whiskey is blazoned on bill boards all over the land," would have been a better sentence of alcoholic type. Since that is no longer blazoned, we suggest: "The merits of Ivory soap are blazoned in many advertisements."

Consider one more: "*bond*—captive; as, 'Whether he be bond or free.'" This illustrates a common tendency of the dictionary-maker to use as an illustrative sentence some familiar quotation that comes to his mind. Unfortunately, these quotations are not familiar to children. Indeed, there is a considerable chance that the dictionary will be used to find out what the word means in that very quotation.

What the child needs is some statement which makes condition of restraint or captivity clear, and connects it with the word "bond." (I am accepting the notion of captivity as the one to be taught, tho enslaved is perhaps a better meaning). So "*bond*—bound, captive, not free, a slave; as, 'This poor bird now bond in a cage was once free in the woods.'"

We have, so far, said very little about formal definitions. Much has been written about the logic of making definitions, but not much about the psychology of understanding them, and that not from the viewpoint of modern dynamic psychology. In general, the intellects of pupils in grades 5 to 9 are not able easily to organize the facts given in a definition into knowledge of the thing defined, even when the words singly are understood. For example, few pupils in grade six will understand what "bandy" means from reading "curved laterally with the

convex side outward, as a leg," even if they know what lateral and convex mean. Some of them will think that "bandy" is a curve, some that it is a side, some that it means convex, and some that it means a leg.

The best form of definition psychologically probably is an approximate synonym with the needed limitation, qualification, or specialization. Thus, "*abscond*—go away secretly; *abhor*—dislike very, very much; *admonition*—warning or advice; *agony*—very great pain; *annihilate*—destroy entirely." In such cases, there are only two or occasionally three or four facts for the child to organize, and the relations are fairly simple.

In framing definitions, as elsewhere, the maker of a school dictionary must consider the learner. A definition should obviously be a means of learning what the word means as well as a convenient way to remember and state what it means when you know it. Eternal vigilance in consideration of the learner is the price of success. Consider this: "*hyena*—a nocturnal, carnivorous mammal of Asia and Africa, allied to the dog." The reader by now is aware of the desirability of changing nocturnal, carnivorous, and perhaps mammal, and of making a picture a main feature of the lesson. He should, however, also note the very grave mistake of "allied to the dog." If the pupils who look up "hyena" have any ideas about "allied," these ideas are probably of help, friendship, and fighting against a common enemy. So they may carry away the interesting notion that hyenas make friends with dogs, as the chief permanent product of the definition. Sound psychology requires "somewhat like a dog," or, if the general theory of descent comes to be a part of the elementary school curriculum, as it should be, "hyenas and dogs belong to the same animal group." This, of course, is assuming the biological correctness of the definition which we are improving. The fact is that the hyena is not much more closely akin to the dog than to other carnivors. On the contrary, the hyenas belong in the cat and civet group (Aeluroidea), while the dogs belong in the other great group of carnivors, the Arctoidea. It is true and useful to say that the hyena is like a dog, but he is more allied biologically to the Viveiridae, so that the less we try to teach sixth-graders about his detailed place in the animal kingdom the better.

I have indulged in this little digression partly in order to make an opportunity to profess my faith that truth is the highest thing a man may seek in a school dictionary or in any other instrument of instruction, and it should never be sacrificed in our zeal for teachability or convenience.

Truth, and truth in a form which fits the learner, should be the aim of the school dictionary and of every other instrument of instruction.

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Adult Learning

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EDUCATIONAL practice has got far ahead of educational theory in the case of adult learning. In summer schools, evening schools, and the like, the men and women in the thirties and forties are invited to learn and are doing so. At the same time we quote a statement of William James: "Outside of their own business, the ideas gained by men before they are twenty-five are practically the only ideas they shall have in their lives. They *cannot* get anything new. Disinterested curiosity is past, the mental grooves and channels set, the power of assimilation gone. Whatever individual exceptions might be cited to these are of the sort that 'prove the rule.'"

By the generous provision of the Carnegie Corporation, we of the Institute of Educational Research of Teachers College have been able to study the learning process in the case of adults in evening schools, adults in prison schools, adults in secretarial schools, and adults in summer schools, during the two years, 1925-1927.

We have been able in some cases to compare the learning of adults with the learning of children at the same tasks, for example, in the prison school where men up to fifty-seven are learning to read, write, spell, and compute, doing the work of grades 3 to 6 in a regular elementary school. In all cases we have been able to compare the learning of groups about forty-two years of age with groups about twenty-two years of age.

There are many complications to be considered and allowances to be made before these comparisons can be made fairly, so as to measure the effect of age uncontaminated by intelligence and amount of knowledge. I shall not take your time for these technical matters. The two important facts which appear are: first, adults of age forty-two learn more easily than they did as children of ten or twelve, second, adults of forty-two do not learn so easily as they did about twenty-two. There is a rise in ability to learn thru childhood and the teens to some place in the late teens or early twenties, an approximate plateau for a few years, and from then on a decline, which in general is about 1 per cent a year.

Adults can then learn on the average as rapidly from twenty-five to forty as they can from five to twenty. But they probably do not. And the reasons why they learn less are worthy of consideration.

The decrease in learning, which does, on the average, occur, may be explained by various combinations of the four factors: general health and energy, ability to learn, interest in learning, and opportunity to learn. A decline in general health is probably of great significance in

respect to the decline in old age but is of small consequence for the ages from twenty to forty. The decline in ability to learn we have seen is too small from twenty-five to forty to balance the gain in ability from five to twenty. We have then to consider chiefly interest in learning and opportunities for learning.

In general, a person has less time to learn in from twenty-five to forty-five than from five to twenty-five. More time is required of him by law and by custom for productive or household labor. The child is specifically protected from productive labor in order that he may grow and learn by school and play. This protection indirectly requires that his parents work more. The adolescent's status varies from that of a child free to give all his day to learning to that of an adult whose day is all needed for other duties than self-improvement, according to the customs of his social class, the assumption of parenthood, and other conditions.

In general, there is much less economic and social pressure toward learning in the later score of years. The child is paid for learning, not in money wages at the time, but in freedom to play when his daily stint of learning is achieved in the approval of teacher and some classmates, and, in adolescent years, by the future financial hopes and immediate present social prestige which attach to progress in high school and college. Modern families and communities force young people to learn in ways that range from obvious rewards and punishments to very subtle but powerful manifestations of opinion and fashion. At thirty, very little of this pressure to learn acts. In nine cases out of ten, the business which employs a man would not find his services more valuable if he learned Latin or calculus or mediaeval history or to play the violin. There are only a very few sorts of learning which will benefit him in his present employment. To study at great length with the hope of then bettering himself by a radical change of employment is obviously risky. In nine cases out of ten the married woman finds, or thinks she finds, that success in getting herself and her children taken care of depends very little on any learning outside a very narrow field.

If both young and old were sent to school five hours a day and worked in our present industrial system five hours a day, and if the economic and social pressure were equalized, there would surely be a notable reduction in the disparity in learning. In the narrow fields referred to above which give, or promise to give, advantage in wages or prestige, adults do pay their good money as well as their time for learning.

These two factors, time for learning and outside pressure, economic or social, are perhaps too obvious to have been mentioned. The one to be mentioned next is so far from obvious that it has received very little attention. It is the time and attention requirement for relearning or not forgetting what has been learned. Information and skills that have been acquired are not at all comparable to money that is put into a perfectly safe bank. They are rather like capital in the form of a building or ship or freight car, that should have an annual charge for depreciation, or for preventing it by repairs. All, or nearly all, learning

vanishes if not used. What a person now knows and can do has been kept alive by relearning, either openly relearning or hidden relearning in the form of such practice as prevents the knowledge or skill from ever falling below par and needing an obvious review. If a child of five lived an average life, except that from then on he must retain everything that he learned, he would, from twenty-five on, be hard put to it to hold his own if he never learned one new thing. We all forget most of what we learn, some of it in a few minutes, much of it over night, and more month by month.

Much of what we learn nobody need wish to retain, but a good deal of it is needed, and preventive practice or relearning for this useful fraction takes time. For example, the average pupil in grade 8 knows after a fashion the meanings of about ten thousand English words. Some of these would not be lost by disuse in a decade, but some would go if not rehearsed within a year. When a man whose profession is scholarship studies, his study not only adds to his knowledge and insight but provides a continual review of what he already knows and a means of exercising and maintaining the powers of insight which he already possesses. Keeping up with one's profession consists in not losing knowledge and skill and power as well as in gaining more. For some factory workers and tradesmen the amount of time required for relearning or review to prevent the necessity for it may be a small, even an insignificant, quantity. And in general it may not be a large factor. But it is a real one. And it is unavoidable.

Relearning is also probably general, applying not only to knowledge and skill, but also to all those subtle results of learning which we call attitudes, powers, tendencies, or traits of personality. There is a natural status, the product of unlearned or original tendencies, from which we change by learning and to which we relapse unless the results of learning are maintained by relearning or some equivalent of it.

Let us now consider the changes in interest.

By the age of twenty-five most persons have, within certain limitations, learned a great part of what they wish to learn. As children and adolescents they have seen others manifesting certain knowledge and skills and powers, and have felt cravings for the possession of these—desires to swim, dance, skate, or drive a car, to have good manners, to understand or pronounce certain words, to know enough of a trade or profession to be able (other things being equal) to earn a living by it, and the like. One by one they have learned these things, in so far as they were willing to give the time and effort needed, and were not prevented by untoward circumstances. This same course of events would in large measure have occurred with reading, writing, simple arithmetic, knowledge of commonly referred to facts of geography, history, and other features of school learning except for the fact that these wants are supplied before they are felt.

As a result of the individual learning what he wishes to learn, and of the home and school having him learn, before he wished to learn them, things which he would otherwise wish later to learn, the ordinary American of today has at twenty-five in large measure supplied his de-

mand for learning. He has had his try at a fairly wide sampling and has either learned the accomplishment in question or been unwilling to pay the price in time and effort. If the offerings of all the schools in the world were available for him in a free evening school beside his home, he would be unmoved by most of them, either because he does not and never did want such or because he tried learning things like it and did not find the game worth the candle, or because he has already as much of it as he wants. He may very likely offer as good reason for declining some opportunity as that he has not enough time, or is too tired, or is too old to learn, when the real effective reason is that his genuine desires for learning have already been satisfied. A few individuals crave so many sorts of learning that life is not long enough to satisfy them; some learn all they want to learn by the early teens; the ordinary man or woman, under present conditions of life in America, has supplied most of his intrinsic natural demand by the early twenties. Thereafter he restricts learning to matters which are to his economic advantage, or which meet desires evoked by new situations like the emergency of war or the invention of the radio, or which gratify desires which were thwarted in youth. In the competition with other ways of spending time, learning weakens relatively year by year as we satisfy one craving after another of those which need learning to satisfy them.

The interest in learning probably often suffers relatively in adult years because the adult tries to speed up the learning and so undergoes more and greater strains and thwartings than does the more leisurely learning of childhood and youth. A child, for example, spends perhaps five thousand hours in learning to understand and use oral English. If as an adult he tries to learn to understand and speak German or Russian, he probably tries to proceed at five times as fast a rate. A college student, highly selected for intelligence, spends perhaps three hundred hours in acquiring a few very simple concepts and principles about production, distribution, and consumption of wealth. If he takes up economics as an adult, he allows less than half as much time for a similar achievement. Common practice is perversely inconsistent in this matter. It assumes that the ability to learn declines in adult years, but assigns much longer or harder tasks per unit of time available for learning.

In general, nobody under forty-five should restrain himself from trying to learn anything because of a belief or fear that he is too old to be able to learn it. Nor should he use that fear as an excuse for not learning anything which he ought to learn. If he fails in learning it, inability due to age will very rarely, if ever, be the reason. The reason will commonly be one or more of these: He lacks and always has lacked the capacity to learn that particular thing. His desire to learn it is not strong enough to cause him to give proper attention to it. The ways and means which he adopts are inadequate, and would have been so at any age, to teach him that thing. He has habits of ideas or other tendencies which interfere with the new acquisition, and which he is unable or unwilling to alter. In the last case mere age may have some

influence. A person's gait, posture, speech, and the like are acquired very early in life. They condition later acquisitions, and they may to some extent impose inescapable limitations.

In general, teachers of adults of age twenty-five to forty-five should expect them to learn at nearly the same rate and in nearly the same manner as they would have learned the same thing at fifteen to twenty. What that rate and manner will be depends upon the general intelligence and special capacities of the individual.

The provision of opportunites whereby adults can learn those things which they are able to learn and which it is for the common good that they should learn is a safe philanthropy and a productive investment for the nation. When, on the other hand, wily advertisements or over-enthusiastic propaganda seduce persons to enroll in courses for which they lack capacity, or interest, or both, there is sure to be waste and disappointment. Age, in itself, is a minor factor in either success or failure. Capacity, interest, energy, and time are the essentials.

Adult education suffers no mystical handicap because of the age of the students. On the other hand, it is not freed by the nature of its clients from any of the general difficulties of adaptation to individual differences, stimulation of interest, arrangement for economy in learning each element, and organization of the subject of study so that each element of learning shall help all the others as much as possible and interfere with them as little as possible. In particular, the argument that the adult student who takes a course voluntarily, will be much more interested in study than the young student who takes it more or less by parental compulsion, so that the stimulation of interest requires far less care and skill in adult classes, is likely to be given too much weight. The adult, too, is often interested not in the day-by-day studying itself but in something ulterior in the promotion or social advantage or self-esteem which he gains. Adult education has an obvious handicap, when, as is usually the case, its students have worked thru the day and so must resist the cravings to indulge in some favorite form of rest or entertainment. In individual cases it may be undertaken at great sacrifice.

On the whole, the facts of adult learning are a strong support to those who have given time and thought and money to adult education.

The facts of adult learning may also encourage industry to face changes in machinery, processes, and the like with the hope of reducing the disturbance by education of workers. The writer, at least, is sure that the hand-weavers who were thrown out of work by the invention of the power loom could in most cases have been taught not only to use the power looms, but also to make them and repair them, or to be useful in whatever factory work or trades were short of employees at the time. A steady, industrious, reliable worker has qualities of body and mind and morals which are too important to be wasted because some industrial change has destroyed the value of the special work which he has hitherto performed. Public or private provision for his education for some suitable work seems highly desirable and likely to cost less and succeed better than has been supposed.

His fear of failure and of being an object of unpleasant attention or ridicule, accentuated by the depressed condition which the loss of his habitual living and life tends to produce, should be allayed or allowed for so far as possible. General awareness and acceptance of the truth about adult ability to learn, and a wider prevalence of adult education will help in this. If his new education is as one of a group in similar circumstances and is provided without the imputation of inferiority to him it will be more acceptable and successful.

In some cases the change can be foreseen, and the education for the new work can be provided by the old employer. Thus, a railroad, when it electrifies certain sections, may educate some of its steam engineers to be motormen. This was done by the New York Central lines, and I understand that their example has been followed successfully by others. Besides these applications to existing forms of adult education and to education as a palliative in industrial changes, there are possible applications to our general scheme of education.

The answer oftenest given by those concerned with the theory or the practice of education would be, "The mind is then much more plastic, easier to mold into desirable ways, that is, much more educable." We have seen that so far as plasticity means ability to learn, the "much" is certainly inappropriate. If there were nothing in favor of early schooling save the greater mental plasticity of youth, in the sense of youth's greater ability to learn, we might better replace "Childhood is the time for learning" by "The time for learning anything is the time when you need it." For there are, as Dewey has taught us, great advantages which accrue when learning satisfies some real need and benefits some cherished purpose and is made use of at once and so is kept alive and healthy for further use.

Plasticity, however, may mean to those who invoke it something more than ability to learn; and learning in early years may have other recommendations than plasticity.

Let us then consider the general question of the placement of schooling in relation to age. If a given amount of schooling, say ten thousand hours of it, are to be given, when shall it be given? What are the advantages of concentrating it in the years from six to sixteen, as is now done? What might be gained from delaying some of it to adult years? If it is possible and desirable to increase schooling by another thousand hours, shall this be put as an addition of five hours a day for five days a week for forty weeks at age sixteen? Let us first set in order the main facts in favor of concentration of schooling in early years.

A human mind develops in part by inner growth, getting and improving certain mental powers as he gets his teeth and stature and strength. This process of development by inner forces is, in most respects, completed by twenty or earlier. If outside forces such as schools are to accelerate, check, redirect, or otherwise alter it, they must in the main act during the years before twenty.

A human being will learn in early years. If the ideas then absorbed are wrong, they must be eradicated. If the habits then formed are harm-

ful, they must be broken. Unlearning errors is a most wasteful form of learning. If schools act on these early years they have the possibility of forestalling much practice in error.

The appeals of sex, power, display, and other natural appetites are so strong that abstract and idealistic interests need reinforcement to hold their own against them. The interests in play which characterize childhood are not so antagonistic to these abstract and idealistic interests and occupations, and may even be used by schools to build them up.

The child, having been dependent upon the adult for food, shelter, general care, and information, is more obedient, acquiescent, and teachable (in the sense of modifiable toward what adults wish him to be), than he will be later. This may not be an argument for concentrating schooling in early years, if the reader sets a low value on docility and conformity and a high value on self-determination, self-expression, and self-government.

We can learn nearly as well when young as when older, but our value as workers at home or elsewhere is far less. So it is wise to go to school when the money value of our time is low.

Other things being equal, the earlier a thing is learned the longer, and so the greater, the use which can be made of it. If it is an advantage to be able to read, it is better to be able to read from eight to eighty than from twenty-eight to eighty.

Let us now turn to the chief facts in favor of alloting a much larger fraction of schooling to adult years than present or past practice has done. They can be presented very briefly.

First, a better selection of persons to be taught could be made. The abilities and interests of individuals can be better known with each year of their growth and experience.

Second, a better selection of the content of instruction could be made, both for persons in their general capacity of individuals, neighbors, and citizens, and for their special duties and privileges as producers and enjoyers. In the early years, many features of history and the social sciences cannot be properly apprehended because the learners lack direct experience of certain facts of life.

Vocational education of all sorts in early years is likely to be wide of the mark because the individual often does not know just what he wishes to do, or is fit to do, or can, under existing conditions, earn a living by doing.

Third, a better arrangement and sequence of learning can be provided. The Dewey doctrine of "first the need, then the knowledge or technique to satisfy the need" can be applied in as thorogoing a way as is desired. The young man who is working in advertising can study salesmanship or psychology. The young woman about to be married can study domestic science. The worker who becomes interested in writing can study English composition.

Fourth, a loss of abilities by forgetting or of time by relearning can be prevented. Children now learn about voting in "Civics" in grade 7 or 8, seven years before they can vote. They learn the arithmetic of

notes years before they will probably have any occasion to borrow or lend money on a note. Certain facts of history and geography they learn only to have entirely forgotten them when the occasion to use them arrives. Other things being equal, the best time to learn anything is just before you have to use it.

Fifth, the lag of schooling behind science and technology can be lessened. When knowledge is advancing so rapidly as it is now, too much of what we learn from ten to twenty tends to be out of date when we are forty. When civilization was more stable and the arts and sciences progressed slowly, it was in general satisfactory for one generation to use during life what it learned in its teens. A man of sixty doing only that now would be in many respects a nuisance and a danger. He would be, for example, unable to drive the commonest vehicle, or to turn on and off the commonest form of light. He would endanger life by neglecting fundamental sanitary precautions. A large part of the social and religious beliefs of the young people today would be quite incomprehensible to him. A progressive development of the sciences and arts needs continuous education either in school or out.

Sixth, there is a real danger that in our zeal to give young people the blessings of more abundant schooling we may be depriving many of them of the satisfaction and instruction which comes from doing something well, measuring up to standard in some respect, accomplishing something in such a way as to earn their own self-respect. Unless the character of schooling is changed in fundamental ways, the fate of from a quarter to a third of the boys and girls of fifteen and sixteen and seventeen, if these are all retained in school, will be one of these:

They will be held back in classes and slowly gain mastery of rudiments of little use to them such as are now taught commonly in grades 7 and 8. They then learn to hate learning. Or they will be forced on to try to learn things which they simply cannot learn, such as algebra or Latin or economics. They then learn to fail and to expect to fail. Or they will be more humanely switched off into trade schools, where they will lead happier and more useful lives, but perhaps not so happy and useful ones as they would lead if they were engaged outright in productive labor. If they were out of school for one or two of these years, they might be glad to come back to school again five or ten years later to learn something which they really needed for labor or leisure, and might be substantially bettered.

These facts in favor of delayed schooling do not make so impressive a showing or as emotional an appeal as those in favor of early schooling; and most thinkers, after surveying them, will probably still favor concentration in early years even up to about ten thousand hours or to age sixteen. The facts should, however, cure us of considering early learning as a law of nature, or as invariably superior, and of treating learning by adults as something irregular, remedial, casual, and often trivial. Furthermore, if a community becomes rich enough to afford eleven or twelve or thirteen thousand hours of schooling for all, it becomes increasingly doubtful whether years should be added on to seventeen, to eighteen, to nineteen, rather than inserted at twenty or twenty-five or thirty.

The placement of schooling cannot be considered properly save in relation to two still broader matters of community arrangements. A scheme of schooling should harmonize with a scheme of productive labor (including management), a scheme of recreation, and a scheme of what is called in family budgets, the "higher life." A scheme of schooling should also arrange for the distribution of schooling quantitatively and qualitatively, deciding not only how much schooling there shall be and what it shall be, but how it shall be divided amongst the population, who shall be encouraged to go to school for eight years, and who for eighteen, who of the latter shall study medicine, and who shall study law, and the like.

It is beyond the province of this paper to present facts about either the adaptation of schooling to a general plan of a community's affairs or the distribution of schooling among individuals. And, without an extensive survey of them, the significance of the placement of schooling in adult years in connection with them cannot be treated. So we shall limit ourselves to statements which may be misunderstood or disbelieved.

Our theories about schooling, recreation, and the higher life are somewhat blinded by an unscientific expectation that somebody will grow wheat and bake bread and make shoes and build railroads and manage factories by some such necessary order of nature as makes the sunshine and the rainfall. This blindness is often accompanied by a certain condescension or even scorn, toward productive labor, which is perhaps a relic of the long centuries of idealization of the leisure class. There is a very real danger that schooling may unfit a community to produce by itself its own necessities and lead it to depend on industrial mercenaries imported to do all the dirty work.

As a psychologist, considering the intricate hierarchies of customs and traditions and checks and balances by which the instinctive tendencies of man are directed into the operations of modern industry and trade, the writer wonders that the whole apparatus does not crack with the strains to which it is subjected or explode from the passions which it harbors in its vitals. He feels most devout thanks for his daily bread. So he looks with favor on a mixture of schooling and productive labor, and is unwilling to assume that the latter is a curse to be postponed as long as possible. He sees hope in adult schooling as a means of social health, and is ready to exchange early schooling for it nearly at par.

The Measurement of Interest as an Aid to Vocational Guidance

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FOR some time there has been activity in the field of measurement of vocational interests. When one reflects that wastes in economic life are chiefly traceable to personnel difficulties to which the worker's loss or want of interest in his task are among the chief contributors, there is no need to wonder at the attention given to attempting to measure vocational interests, especially for vocational prognosis. Altho physical strength, endurance, personality, special sensory equipment, general intelligence, and emotional traits are important factors in the individual's vocational adjustment, it is claimed that the discovery of his vocational interests will go a long way toward helping him find himself in the world of work.

There is reason to believe that educators may find the discovery of pupil interests valuable in vocational guidance. An enthusiast might claim that the vocational counselor's problem is merely to find out the pupil's specific vocational interest and then use such information as the criterion for counseling him in the choice of curriculum and in placement. The problem, unfortunately, is not so easily solved.

It is the purpose of this paper, first, to inquire into the nature of interest; second, to evaluate attempts made to discover interests of the individual; and, third, to suggest a procedure in interest analysis which will be of assistance to the counselor in giving guidance to a certain age-sex group.

What is interest? Burnham (4)* describes it as, first, the affective accompaniment of all attention, a state of feeling; and, second, a permanent mental possession, a habit of prevision calling into existence habits of association and their accompanying emotional contents, both inherited and acquired. Dearborn describes interest as the permanent possibility of attention. When one's attention to an object is capable of being called out under all conditions, he is interested. Interests arising from instinctive tendencies may be built up thru similarity and are subject to the laws of learning and forgetting. Situations entirely new or entirely old will not elicit interested behavior. Smith and Gutherie (21a) explain that attending to an object entails the orientation of the sense organs toward the source of stimulation, lowering the response threshold and the cessation of movements not serving to explore the object. The pulse of attention lasts less than a second. The readiness of the organism to respond to a situation, which may be called interest, depends upon the emotional drive which may be conditioned to all like situations.

* References in parentheses are to the bibliography following this paper.

Since the days of Plato there has been much thinking and controversy among philosophers and teachers concerning interest and effort. There have arisen the disciples of interest and the disciples of effort. In America attention to harmonizing interest and effort in education began in the nineties, and probably the foremost leader in the movement was John Dewey.

Dewey (7) says that genuine interest is the accompaniment of the identification, thru action, of the self with some object or idea; hence interest means unified activity. Interest is a growth which comes thru acting upon nascent tendencies. Making things interesting means that objects are selected in relation to one's experiences, powers, and needs; and as experience grows, interest grows. Anything repellent becomes interesting when seen as a means to an end already commanding attention. The meaning of the finished form is transferred over into special acts of the task. The end merely denotes the final stage in the activity and the means the earlier stages. Afterwards we tend to separate the result from the process and call that the interest. When the end product is reached, it becomes a factor in another activity. While the activity is in progress, the end means the object standing as the culminating stage in the whole process. Pleasure, which is the immediate reaction in each step, and happiness, which is a series of pleasures, permeate the whole process. Given a growing activity, occupation or interest, happiness takes care of itself. Only when the activity becomes monotonous does happiness cease to attend it.

Commenting further upon the nature of interested behavior, Dewey says that interest means that a person has identified himself with, or has found himself in, a certain course of action which may cover longer or shorter times according to circumstances. An activity of short span is a direct interest; spontaneous play is an example. When direct passes into indirect interest, it will be found that activities and objects first esteemed because of their place within the original activity have grown to be of more account than for the sake of which they were first entertained. Indirect interest indicates that a group of simple activities grow into more complex ones which require longer and longer times for their execution. The postponement of achieving the end which gives decisive meaning and full worth to the successive steps permits the conflict of interests.

From the foregoing descriptions and explanations of the nature of interest by Burnham, Dearborn, Smith and Gutherie, and Dewey, certain conclusions relevant to the measurement of interest may be drawn.

First, interest is an emotional response subject to the laws of learning. Altho simple interested responses may be elicited by biologically adequate stimuli, complex ones are acquired, built up, may be learned and forgotten, but are not nascent.

Second, the permanence of interest depends upon the ability of an individual to have growing experiences, and upon the capacity of an object to permit growing experiences about, in, and with it. The capacity to become interested therefore depends upon what is known as general intelligence. At the point where there is nothing more to be learned or nothing more can be learned, interest ceases.

Third, the nature of interest implies certain principles of mental hygiene. Thru wholesome interests one can integrate his mental life. As direct interests merge into indirect ones, and when the end point of interested activity entails acts of will, strains are put upon one's mental life. Thru adoption and adherence to constructive and creative and purposive interested activities, one can reach selfhood.

Fourth, interests are difficult to measure. Isolated, overt interested behavior is not a reliable criterion of implicit interest. The task is made more difficult for the educator because the immature interests of growing humans are more often submerged by new conflicting ones. It is easy to find the interest of one already happily adjusted in his vocation, but such information merely proves what is already known. It is when dealing with persons who have not already identified themselves with any activity that the trouble arises. Such persons may be equally interested in several vocations in as many divergent fields, and such direct interests as he may have may not be joined with the required ability for such vocational activity. In studying interests the investigator must continually be on his guard against confusing the objects of interest with the functions of interest.

Consideration will now be given to attempts which have been made to measure vocational interests, the reliability and validity of such measures, and conclusions.

Kitson (17) classifies methods of measuring interests into objective and subjective. The objective method is based upon the theory that involuntary reactions reveal hidden interests. These involuntary responses are indicated by a galvanometer needle which deflects with changes in heart beat and blood pressure when stimuli are presented to the subject under controlled conditions. Granted that conditions are carefully controlled, there are inconsistencies in the amount and deflection of the needle of the galvanometer. Moreover if the subject should react positively to a horseshoe, what vocational significance has such a response? There is reason, therefore, for doubting the validity of such a measure.

Subjective methods of interest analysis give some promise of success, altho they are subject to many difficulties. Adler's report that 57 per cent of the children questioned by Kramer desired adventurous callings that would keep them away from home is interpreted by psychoanalysis, a form of the subjective method, as an index to superiority. Such an interest more likely arose from normal causes than from phobias. Psychoanalysis, as a form of analyzing vocational interests, is of little use to the educator except in psychopathic cases.

The most common form of subjective interest investigation is the tabulation of occupational choices and ambitions of young people. Douglas (8) made such a study of 2,844 high school seniors of the state of Washington; likewise Schmidt investigated the vocational choices of 15,263 pupils in Wisconsin high schools. McCracken (18) did the same in the high schools of Denver and Longmont, Colorado, and of Cincinnati. These men wisely refrained from generalizing too far in their studies. McCracken observed that, whereas the majority of all pupils expressed vocational choices and that the choices are not in ac-

cordance with social needs, these pupils are seriously interested in occupations and must be enlightened and given vocational guidance.

There have been studies made of the permanence of specific vocational choices made by young people. McCracken (18) found that in the year intervening between two censuses of vocational choice, 60 per cent of the pupils of junior high schools of Denver made the same choice. Douglas (8) claimed from data obtained in one census in Washington state that 85 per cent of the pupils had made their choices within three years, 50 per cent within two years, and 54.6 per cent had changed in the last year. Crathorne tried to determine the change of mind of two thousand college freshman students between entering high school and entering college. He claims to have found that of the 57 per cent who had made choices on entering high school, one-half had changed their minds by college entrance, at which time 85 per cent of the two thousand had made definite choices.

Likewise Franklin (10) studied the permanence of vocational, subject, and recreational interests of junior high school pupils of Baltimore. Three years (11) after the original study, he found that 73 per cent clung to their original type of vocational interest and 60 per cent to the actual choice originally expressed. The following conclusions were drawn from the study: (1) junior high school pupils have a high degree of permanence of vocational interest over a period of three years; (2) vocational interests are more subject to change while the child is in school than out of school; (3) children with nonprofessional interests furnish the greater number of school eliminations. If these conclusions are valid, they have important educational implications.

There are conditions which tend to invalidate conclusions drawn concerning the permanence of vocational choices of high school or college people. Faults with the investigations are that they deal with interests remembered four years later, or that objects of interest may be confused with the functions of interest. Let us assume that there is a high degree of permanence of vocational interest from the junior high school age on. It is questionable that it would be expedient or desirable for the counselor to depend upon a developing human's specific occupational choice for determining his training and preparation. What are some possible factors which may have caused him consistently to choose the same vocation at different censuses? It may be parental pressure, a desire for something easy, anticipation of large monetary reward, ignorance of preparation necessary, glamor of the vocation, fear of hard work, occupational snobbishness, and the like. The writer has seen many a young men change his choice when confronted with the facts in the preparation for medicine, the crowdedness of the legal profession, the toil and study entailed in preparation for engineering, and the risks incurred and the qualifications necessary for business executiveship. Real vocational interest must be born of experience, which means occupational enlightenment thru information, exploration, and tryouts. Even if these specific occupational choices are permanent, we must agree with McCracken (18) that they are not in accordance with social needs. Moreover, an enlightened occupational choice for which the chooser is not

physically, mentally, or temperamentally fitted will lead to inevitable vocational maladjustment.

Studies have been made wherein the mental ability of the choosers has been compared with that required by the occupations of their interest and ambition. Bridges and Dollinger (3) had students rank their interests in subjects and their abilities in each. At the end of the semester the correlation of their interests with teachers' marks was .25 and the estimates of their ability with teachers' marks was .28. They concluded that a person's relative interests are very inaccurate symptoms of his relative capacities as revealed by teachers' marks.

Freyer (14) compared the intelligence scores of a group of college students with the intelligence levels of the vocations in which they were interested. He found that 41 per cent had more intelligence than was required for the vocation, 44 per cent had the same as required, and 15 per cent less. He concluded that if professed vocational interests had been accepted as sole guide in the adjustment of this group of young people, 56 per cent would be maladjusted. Using the same kind of investigation for high school pupils, Proctor (20) found that 41 per cent would be maladjusted. Feingold (9) believed that the same condition would occur in 54 per cent of the junior high school pupils he studied. From the foregoing studies Freyer (14) concluded that the interested responses of small children are totally unreliable for vocational prognosis, the vocational ambitions of grammar-school pupils only about one-fifth significant, and those of college students less significant than those of high school pupils because of the disturbing element of higher intelligence brought about by selection.

Before accepting the conclusions of Freyer, Procter, and Feingold, we should understand that they believe in the validity of certain occupational intelligence levels. We do know that there are certain critical levels of general intelligence measured by test below which success in certain levels of the occupation is questionable. Furthermore, personnel experts discourage the employment of workers who are too intelligent for the job. We do not know just what the critical levels of general intelligence above which "too intelligent" are. Moreover, a number of occupations permit the use of high intelligence in their upper levels.

Inasmuch as attempts to discover the individual's specific occupational interest give the counselor little that is valid, it is possible that he can find something of value in attempts to discover the general field or direction of the individual's vocational interest. This objective has the best chance of being realized. The instrument used for such investigations is usually the interest questionnaire.

Uhrbrock (23b) tried to determine the extent to which persons are interested in the manipulation of Things, Ideas and of Persons. The subject was asked to check his choice of the three. To determine the validity of the measure, the investigator correlated each subject's selected field of interest with his scores on the Thorndike Intelligence Examination, which is designed to measure ability in manipulating ideas, and with the Stenquist Picture Test of Mechanical Aptitude, No. 1. He found a significant correlation between the general field of interest and

abilities measured by the tests. Miner (19) developed a questionnaire whereon one checks his choice of contrasting general interests; e.g., indoor work, outdoor work, neither; slow work, rapid work, neither; rapid movement, slow movement, neither; skilled hand work, skilled heavy work, neither; and the like. He has developed a table for evaluating psychographs of student work interests in teaching, engineering, law, and medicine. These methods of Uhrbrock and of Miner are subject to criticism. First, a subject's reaction to abstract, complex stimuli included in the questionnaires is subject to much personal interpretation, uncertainty, introspection, and rationalization. Second, the writer, by a study of the Stenquist test, determined to his own satisfaction that its reliability above certain age groups is questionable. Third, the fact that plenty of time is permitted the person to check the questionnaire detracts from the value of its results.

The method which the writer believes presents great possibilities for success in discovering the general field of a person's interest was developed by Dr. Max Freyd (12). Somewhat like Uhrbrock and Miner, his purpose is not to show strength but direction of interest. The two directions of interest Freyd chose to explore are the humanic and the mechanic. The former roughly connotes extroversion and the latter introversion. By comparing persons of humanic and mechanic directions of interest, he (13) classified traits as follows:

Humanic	Mechanic
Socially able	Self-conscious
Credulous	Careful of detail
Suggestible	Inhibited and cautious
Adaptable	Reticent
Excitable	Absent-minded
Self-confident	Glum
Un-self-conscious	Able in fine coördination
Talkative	Excels in slow, painstaking, and accurate effort
Present-minded	
Good-natured	

Freyd cautiously and wisely refrains from using these types of general interest in dichotomizing humans, and maintains that his interest analysis blank is useful only in detecting extremes of interest direction. His questionnaire is composed of over two hunderd items comprising a hundred occupations and a hundred or more sports, books, kinds of persons, and the like. Each item is followed by the letters L, ?, D, and U. If the person likes the item, he crosses out L; if he dislikes it, he crosses out D; if he is indifferent to it, he crosses out ?; and if the item is unknown to him, he crosses out U. To determine the validity of the blank, he submitted it to two selected groups of people whose known occupational interests were in engineering and in selling. Obviously, the direction of the former was mechanic and of the latter humanic. To the items crossed out a significantly large number of times by the socially minded persons, the score +1 was assigned, and to those crossed out a significantly large number of times by the mechanically

inclined, —1 was given. The significance of each item was determined, as follows: the difference in percentages crossing the item out in the two groups had to be twice the standard deviation of that difference.

$$\text{P.E. (diff)} = \sqrt{(\text{P.E. med. 1})^2 + (\text{P.E. med. 2.})^2}$$

One's score on the blank is determined by the algebraic sum of the pluses and minuses. Strongly minus scores indicate general mechanic direction of interest and strongly plus scores general social or humanic direction of interest.

The blank was found to be valid in determining the direction of interest of the two selected groups of experienced adults. The curves of the reactions of these two groups showed little overlapping. When the blank was given to students of business and students of engineering, there was much overlapping. Freyd concluded that less highly selected groups were less likely to show the two directions of interest. He found the critical score to be +3, hence the blank seemed to show that the average adult is slightly socially interested.

Studies to determine the reliability of Freyd's blank have been made. Miss Hubbard (16c), at the University of Minnesota, concluded that the blank is reliable enough to justify its use in further differentiation inasmuch as group differences are significant and individual scores have been found to be both significant and permanent. If the blank was reliable for a group of junior high school boys whom she examined, it might be concluded that persons of this age-sex group are more interested in things than in persons. The median score of sons of professional men was —1 and of sons of non-professional men was —2.22.

Cowdery (6), at Leland Stanford University, used the blank to analyze the directions of interest of experienced men in engineering, medicine, and law; of graduate students in each field; of students in the upper and lower divisions of the university; and of high school senior boys. He concluded that since the differences in humanic and mechanic interests of the professional groups were not much more diverse than those for men in general, the blank would be of little use in guiding young people of no experience.

Strong (22), also of Leland Stanford, tested the reliability of the blank for thirteen occupations. He assumed that in any vocational environment some traits are employed and some are not; that liking and disliking are rough indications of what one does easily or with difficulty; that one likes a vocation in which his well developed traits can function and in which his poorly developed traits need not function; that one tends to remain in a vocation he likes and leaves one he does not like for one he imagines he will like. Therefore it seems theoretically that the sum of one's likes and dislikes in a given occupation represents a measure of his traits. Altho Strong found that the blank did reveal humanic and mechanic interests, he questioned its effectiveness in vocational prognosis. He suggested that the attempt be made to measure the totality of mind-set under given conditions, since it cannot be told whether an item of the blank indicates the presence of one or many traits.

It is questionable that Freyd's blank is effective in locating those

humanic and mechanic interests characteristic of certain occupations. It is doubtful that much can come from attempts to discover general interests assumed to be necessary to a given occupation. To assume that the lack of marked humanic interest would result in failure in the legal profession is in error, because many office lawyers who are markedly wanting in humanic traits have achieved great success. Just now Steen and Estabrooks, of Colgate University (21b), are making a study of the relationship between introversion, which the mechanic direction of interest roughly connotes, and vocational choice; and the figures they have found thus far do not reveal any relationship. One can no more think of occupations in general in a hierarchy of interest traits than with respect to general intelligence in terms of tests.

On the other hand, it is possible that this shortcoming of Freyd's blank does not render its method useless for the educator. He is, or should be, concerned with learning the broad direction of the interest of the young person whom he is counseling, and with providing those activities thru which the individual can develop for himself, with guidance, specific integrating interests. Guidance is more comprehensive than vocational guidance. To quote Brewer loosely, "Guidance is helping young people organize, improve, and extend their individual and coöperative activities," out of which desirable social, religious, cultural, thoughtful citizenship, vocational and healthful behavior may be developed. Indeed, education itself is guidance. Guidance is not prescription, duress, or discipline in the usual sense of the word. Whenever a young person is confronted with conflicting situations out of which a choice must be made, guidance is necessary. It is therefore desirable that the counselor discover the broad, general field of activity which elicits interested behavior in the individual. From these general fields of activity the young person can develop with guidance desirable specific interests.

If such general direction of an individual's interest can be discovered, it must be studied developmentally. It is possible that the play interests of young people form a very fruitful source from which their general direction of interest can be obtained. Play interests are actual; they are not inflicted; they are more untrammeled. Freyer may say that the vocational interests of children are valueless for vocational prognosis, but the play interests of children, if properly evaluated and developed, are precious aids to their ultimate happy vocational adjustment. We cannot say with authority that the play interests of children are not as serious as the vocational interests of adults. Are play activities not truly vocational activities? Would it not be far better for the adult that the same emotional quality of the play of childhood should color his grown-up vocational activity? It should be the aim of all effort directed toward happy vocational adjustment to bring to work the emotional quality of play. Thru a wise educative process, step by step, it may be possible to condition the emotional quality of play to different gradations of stimuli, chosen with due regard to the consecutive development of the individual, until that point is reached where the emotional quality of play is conditioned to the vocational activity of the adult.

Such a process should leave to the individual the actual choice of developmental activity so long as it is socially desirable. The province of the educator is to guide wisely without duress or prescription. For these reasons the writer believes that any one who attempts to explore the general direction of interest found among young people of the high school age should give much attention to the analysis of their play interests.

It seems that the method used in Freyd's interest analysis blank recommends itself to the educator for several reasons: first, it makes no effort to isolate specific vocational interests, but the purpose of the method is to discover the general direction of interest; second, the method is based upon the assumption, which seems to be sound, that thru specific reactions of the individual to many varied objects of interest, the general direction of his interest will emerge and the specific fade out; third, the method eliminates much introspection and rationalization, because it does not intend to give an exact measure and it provides little time for the individual to rationalize his reactions.

The problem of the counselor, and the writer is thinking in terms of the secondary schools, makes it necessary to revise Freyd's blank for use among young people of that age. All that the writer has thus far been able to find out about Freyd's blank has been concerned with its validity and reliability with respect to adult groups and their occupational interests. Therefore, since interest should be conceived of as a developing, emerging activity, and since counselling in the secondary schools should be considered more comprehensive than giving vocational guidance, Freyd's blank should be revised to fit the experience of pupils of this group. The remainder of the paper is concerned with such revision of the blank.

Realizing the differences in the objects of interest which characterize the sexes and the development periods of the high school age, the writer limits himself to the consideration of the direction of interest among boys of the last two years of the junior high school period. It is the purpose to learn, if possible, the general direction of interest of boys of this group and not their specific vocational interests. It is not the purpose to create an instrument to divide members of this age-sex group into those with humanic and those with mechanic directions of interest; but it is the purpose to move the discoverable extremes of these two general directions of interested behavior, if possible, nearer to the central tendency. The use of types has no place in any plan used in dealing directly with human beings. Sir John Adams wisely admonishes teachers to forget their psychological principles and types of behavior after they enter the classroom. The same advice is equally as appropriate in the counseling of young people.

It is probable that users of measurement instruments are too likely to be content with quantitative results. The analysis of a person's reaction to the specific items of a test, blank, or questionnaire is a source of vastly important data which can be used in the counseling of that person. An interest analysis blank, properly used, can afford a counselor valuable hints concerning the individual's social, ethical, educational, cultural, thoughtful, as well as vocational reactions.

The first problem of developing an interest analysis blank to reveal the humanic or mechanic direction of interest among boys of the late junior high school age is twofold. First, there must be collected a list of significant objects of interest to which boys of this age can react positively or negatively. Second, the possible reactions of such boy to the selected objects of interest must be evaluated so that a quantitative result of his reactions may be learned.

As was pointed out before, the writer believes that the inclusion of large numbers of occupations in the list of objects of interest to which boys of this age will be asked to react is a mistake. A boy's reaction to such is not often based upon experience or reliable information. It is possible that Miss Hubbard's tentative conclusion that Freyd's blank showed boys of this age more interested in things than in persons is the result of so many occupations listed in the blank. It is possible that boys of this age are no more mechanic than grown-ups if their reactions to kinds of play and to objects other than occupations are considered.

For four years the writer has been chiefly concerned with boys of the junior high school age. From a record kept of their play, work, social, school, religious, and reading activities and hobbies a number of objects of interest of sufficient frequency has been selected. Their reading interests range all the way from *The Riding Kid from Powder River* to *Pilgrim's Progress*, and from *The True Story Magazine* to *Scribner's* and the *Atlantic Monthly*. Group interests range from athletic organizations or gangs known as the "Spades Park Midgets" and the "Tuxedo Bears" to membership in northside Sunday Schools. School subjects and a number of items from Freyd's blank, which describe kinds of persons, have also been selected, all of which have been combined into a tentative interest analysis blank or questionnaire. The items comprising the questionnaire, which number 149, have been divided into the following groups: sports and games in which the boys have participated, miscellaneous things they may have done, persons and things they may like or dislike, and school subjects. Following each item are the symbols L, ?, D, and U. If the boy likes the item, he circles "L"; if he is indifferent to it, he circles "?"; "D" if he dislikes it; and "U" if it is unknown to him. At the beginning of the blank and before each group of items are directions to be followed in the checking. The time for checking the questionnaire will be limited. The following is an abbreviated copy of the questionnaire:

INTEREST ANALYSIS BLANK

Below is a list of things each of which you may like or dislike. It is probable that you neither like nor dislike some of the things mentioned, and, if you feel that way about them, it may be said that you are indifferent toward those things which you neither like nor dislike.

After each of the things, or items, in the list are the symbols "L," "?," "D," and "U." If you like the item, draw a circle around the letter "L." If you dislike it, draw a circle around the letter "D." If you are indifferent to it, put a circle around "?." If the item is so un-

known to you that you cannot tell whether you like it, dislike it, or are indifferent to it, draw a circle around the letter "U."

ENCIRCLE "L" IF YOU LIKE THE ITEM.
ENCIRCLE "?" IF YOU ARE INDIFFERENT TO IT.
ENCIRCLE "D" IF YOU DISLIKE IT.
ENCIRCLE "U" IF IT IS UNKNOWN TO YOU.

The items are divided into four parts: I, II, III, and IV. Do not fail to read the directions before each part. Do not skip any item. Do not consult anyone after you begin. Do not take the list from the classroom. Your time is limited. Does everyone understand what is to be done? You may begin.

I.

Below is a list of sports and games in which you may or may not have taken part. If you like taking part in the game or sport, encircle "L"; if you dislike taking part in it, encircle "D"; if you have taken part in it and neither like nor dislike it, encircle "?"; and if you have never taken part in it, encircle "U."

1. Swimming	L ? D U	9. Fishing	L ? D U
2. Playing football	L ? D U	10. Coasting	L ? D U
3. Playing basketball	L ? D U	11. Dancing	L ? D U
4. Playing golf	L ? D U	12. Bowling	L ? D U
5. Roller skating	L ? D U	13. Playing soccer	L ? D U
6. Playing baseball	L ? D U	14. Playing marbles	L ? D U
7. Hiking	L ? D U	15. Playing tennis	L ? D U
8. Hunting	L ? D U	16. Bicycle riding	L ? D U

(Thirty-three items in this division)

II.

Below are a number of things you may have done. Circle a symbol after each item according to the directions given you in I. Remember, if you have never done the thing which the item tells about, you should encircle "U."

1. Taking part in arguments	L ? D U	9. Listening to a story	L ? D U
2. Telling a story	L ? D U	10. Having interviews with people	L ? D U
3. Having a joke played on you	L ? D U	11. Playing by yourself	L ? D U
4. Meeting strangers	L ? D U	12. Living in the country	L ? D U
5. Living in the city	L ? D U	13. Reciting in class	L ? D U
6. Debating	L ? D U		
7. Playing with a group of people	L ? D U		
8. Being left to yourself	L ? D U		

(Fifty-six items in this division)

III.

How do you feel about each of the persons and things listed below? Encircle the symbol after each item which describes best your feeling toward the item.

1. Tom Mix L ? D U
2. *National Geographic Magazine* L ? D U
3. Slow people L ? D U
4. *Popular Mechanics Magazine* L ? D U
5. Nervous people L ? D U
6. Animals (pets) L ? D U
7. People who disagree with you L ? D U
8. News movies L ? D U
9. Very untidy people L ? D U
10. *Scribner's* L ? D U
11. People of your own age who know more than you do L ? D U
12. People younger than you L ? D U
13. Stories of the sea L ? D U

(Forty-two items in this division)

IV.

After each school subject listed below encircle the symbol which best describes your feeling toward the subject.

1. Mathematics L ? D U
2. Science L ? D U
3. Physiology L ? D U
4. Shop work L ? D U
5. Mechanical drawing L ? D U
6. Oral composition L ? D U
7. Civics L ? D U
8. Written composition L ? D U
9. History L ? D U
10. Nature study L ? D U
11. Foreign language L ? D U

(Eighteen items in this division)

The second general problem, that of evaluating reactions to the objects of interest included in the questionnaire, is several fold. After the blank has been submitted to the boys, ambiguities in the statement of items and in the directions may be discovered and corrected. Items after which the great majority encircle "?" or "U," indicating indifference to or lack of knowledge of, may be eliminated and others substituted. Items which seem to be not significant for humanic or mechanic direction of interest may be discovered by evaluating the symbols after each.

The evaluation of the symbols after each item in terms of humanic or mechanic direction of interest each symbol implies raises a problem of statistical procedure concerned with the validity and reliability of the measure. The difficulty lies in the choice of an objective criterion to which the results from the blank may be correlated. Freyd, Strong, and Cowdery chose two groups of adults whose occupations connoted either humanic or mechanic directions of interest. From the results of the two groups of reactions, coefficients of validity were computed and evaluations were ascribed to the items. It is difficult to see how

the same procedure can be used for an interest analysis intended for boys of the junior high school age. One might select two groups of boys whose subject choices and school achievement in the subjects, or two groups whose outside or extra-curricular activities, connote humanic and mechanic directions of interest. Such study may well be used for subsequent investigation of validity and reliability, and for eliminating crudities.

In order to begin the evaluation of the symbols "L," "?," and "D," the writer has decided to use the quantitative judgments of twenty-five men teachers. Each adult has had placed in his hands a copy of the tentative list of objects of interest and a page of instructions to be followed in rating each symbol after each item. Detailed descriptions of humanic and mechanic directions of interest are included in the instructions as well as examples of ratings. Five ratings are possible after each symbol: 2, 1, 0, —1, and —2. Negative quantities signify mechanic direction and positive ones humanic directions of interest. The following is a copy of the instructions given to the adults who are rating the symbols after each item:

Instruction for Rating the Interest Analysis Blank

It has been said that there are two general directions toward one of which one's interest tends. They are the HUMANIC direction and the MECHANIC direction.

I. A person whose interests tend toward the HUMANIC direction may be thus described:

a. He likes being with persons, crowds; he likes group activity.
b. He is not very sensitive to differences in human personality; he likes persons because they are persons.
c. Solitude depresses him; slow, painstaking, and accurate effort disturbs him.
d. He is socially minded, good-natured, credulous, adaptable, self-confident, suggestible, and not over-cautious.
e. Things irk him.

II. On the other hand, a person whose interests tend toward the MECHANIC direction may be described as follows:

a. He likes working and playing with things, and doing work or such play which requires carefulness of detail and slow, painstaking, and accurate effort; he likes solitude.
b. He dislikes group effort and crowds.
c. He is hard to approach; he is self-conscious and very cautious.
d. He is very sensitive to differences in human personality; peculiarities of personality color his reaction to the person who wears the personality.
e. Groups of people disturb him; the smaller the group the better for him.

There follows a list of objects of interest. Liking some of them may indicate a HUMANIC direction of interest; e.g., "playing football." Disliking "taking long walks alone" may indicate a HUMANIC interest; liking to do so may indicate MECHANIC interest. Liking or disliking

"very fat people" may indicate MECHANIC interest, and being indifferent to the fatness of people may indicate HUMANIC interest.

Following each item in the list are the symbols: "L," which means liking; "?," meaning being indifferent to; "D," meaning disliking. It is our purpose to ascribe to each of the symbols, following each item a numerical quantity, and we want you to help in the undertaking. A positive quantity should indicate HUMANIC direction of interest; a negative quantity, MECHANIC direction; and zero, neither one. Decimals should not be used. In no instance should the rating be greater than +2 or less than —2. Plus 2 means very high humanic interest; —2 means very marked mechanic interest; and zero, no marked direction one way or the other.

Assume that you are rating the reaction of a person to "taking long walks alone." Should he encircle "L," he may show a strong mechanic interest; therefore "L" in this instance might be rated —2. Should he encircle "?," he may show absence of any direction of interest in this instance; therefore zero might be the rating of "?" after this item. Should he encircle "D," it may be inferred that his dislike of solitude indicates strong humanic direction of interests; therefore "D" after the item may be rated +2. The ratings might then appear:

Taking long walks alone	L(—2)	?(0)	D(+2)
Visiting amusement parks	L(+2)	?(0)	D(—1)
Very fat people	L(—1)	?(+1)	D(—2)

Please rate all the symbols after each item, using no numerical quantity greater than +2 or less than —2. Record thus your best judgment of what the reaction implied by each symbol after each item means in humanic or mechanic direction of interest. Positive numbers mean humanic direction; negative numbers, mechanic; and zero, neutral. Please use no decimals or no number greater than +2 or less than —2. Refer repeatedly to the definitions given in I and II. It will be better if you do not rate all the items at one sitting.

After the rated lists of items have been collected, the ratings of each symbol after each item will be tabulated as follows:

Item: "Visiting amusement parks."

L 2——
1——
0——
—1——
—2——
? 2——
1——
0——
—1——
—2——
D 2——
1——
0——
—1——
—2——

The quantity which marks the median rating after each symbol may be the one tentatively adopted as the value of the symbol after the item, provided the median rating is equal to or greater than 3½ times the P.E. of the distribution. The symbols may be weighted in another manner; the algebraic sum of the products of the quantities used in rating and the number of ratings after each quantity, divided by the total number of ratings (in this instance 25), will give a quotient which may be adopted as the value of the symbol after the item. For example:

Item: Visiting Amusement Parks

Symbol	*Quantity*	*No. of Ratings*	*Product of* $Q \times R$
L	2	15	30
	1	8	8
	0	0	0
	—1	2	—2
	—2	0	0
		—	—
Total		25	36

The quotient which results from dividing positive 36 by 25, the number of ratings, is positive 1.4, the number which may be adopted as the value of the symbol "L" after this item. It may be noted that quantitative judgment in this instance indicates that to like "visiting amusements parks" shows rather marked humanic direction of interest.

The writer is well aware of the difficulty from subjectivity in the procedure described. Dependence is temporarily placed upon quantitative judgments instead of coefficients of correlation. The method, however, is somewhat less subject to error than the usual rating scale because the number of judgments is greater. On the other hand, the number of judgments per rater is much greater than is usual in a rating scale.

The question may be asked: To what specific use may knowledge of a boy's general direction of interest be put by the counselor? The writer has often witnessed a slump in the quality of school work of some boys soon after the second semester of the ninth grade. It may be that this slump is due not only to physical causes attendant to early adolescence but also to marked development of humanic interest. If the development of humanic interest is a marked characteristic of this age, an interest analysis may help to discover it; and if this condition is a concomitant of the slump often seen in the quality of school work of this age, it bears important educational implications to counselors and curriculum builders. Moreover, it is possible that such an analysis may help to explain the failure of a pupil with high I.Q. to do the quality of school work of which he is capable. Such an analysis may also help to explain the failure of a pupil who does excellent school work to be equally as successful in the work of the world among people. The counseling technique necessary in each of the three cases just mentioned raises too many problems to be considered in the scope of this paper. It may be said, however, that in each case the counselor has his job cut out for him, and the pupil's specific reaction to items of an in-

terest analysis blank such as the writer is trying to develop should give the counselor valuable hints concerning the trouble.

It is the purpose of the interest analysis to locate greater numbers of pupils at the extremes of interest direction. In no case should it be considered a substitute for the personal relationship between counselor and the counseled in guidance, or for exploratory experiences and tryouts. We must not, as Brewer says, formulate thought of the limitations of the individual after he has reacted to this or any such measure. It is intended to be an aid to the formulation of an intelligent tentative attitude on the part of the educator.

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Educational Tests and Educational Guidance

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AT the Conference on School Counseling, Professor Thorndike discussed informally the use of educational and vocational tests in educational and vocational guidance. He pointed out that the effects of human nature, education, and vocation were extremely complex and that nothing in the way of a panacea could wisely be expected. He emphasized the importance of making the measurements that we did take, extended enough and often enough repeated, to give accurate measurements of what they purport to measure. It is a matter of encouragement, that we can, even now, make a prophecy of success in school work in general on the basis of a three-hour intelligence test which is as valid as we can make from knowledge of the pupil's entire school record for several years. It is also encouraging that, when we combine with such an intelligence test information about time spent in study and other factors, we can improve this prophecy. Recent differences in the use of tests of honesty *versus* deceit indicate that subtle moral qualitites may be measured to an extent which no one would have expected ten years ago. On the whole, pencil-and-paper tests of abilities, of interests, and of personal abilities will be very useful if we do not expect too much from them or misuse them. They are far from being as accurate as we would like them to be, but they are often better than the personal impressions which they replace; they are always useful as a supplement to personal impressions.

A Method for Studying the Unmeasured Traits of an Individual

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IN our present-day attempts to develop the individual and to guide him, and aid him in guiding himself, the lack of information, both in amount and reliability, must be recognized as one of the chief difficulties to be met. But the emphasis upon this point during the last few years has stimulated workers to increase tremendously our store of valuable information in many phases of the work—occupational opportunities, occupational requirements, working conditions, avenues of approach to occupations, means of preparing for various occupations, etc. In all of this, however, the emphasis is placed upon only one side of the equation which must be solved in aiding satisfactory adjustment of people and work, namely, the work side. Of course this is a very important member of the equation, but the other side—the individual himself—should not be neglected, but should also be treated according to the best means available.

Of course some emphasis has been given this last-mentioned phase of the problem, but in a great many cases it is, so far as any systematic way of dealing with it is concerned, far behind the other aspects, and in some cases it seems to be scarcely considered. And yet how many of our dealings with problems in this field really involve the personal or individual aspect of the problem primarily! Is it not just as important to push forward our methods and procedures for analyzing the individuals concerned as it is to analyze the occupation? Is it not the fact that we recognize wide individual differences in those with whom the typical vocational counselor has to deal, one of the chiefest reasons why we so strongly urge analysis of the occupational fields?

In some centers we find, at this time, that considerable attention is being given some phases of the individual differences, such as are revealed by intelligence test scores, grades made in school, and in other outstanding modes of behavior, in addition to those differences on the physical side. Some of these forms of data are used somewhat hesitatingly, when used at all, because thru what perhaps might be called a misuse of them counselors have found their application rather highly limited. There is still another kind of data which is sometimes used, namely, personality traits, or in more psychological terms, particular behavior patterns, but too frequently they are poorly determined, both in extent and in accuracy.

This term "personality trait" means different things to different people. Psychologists themselves are not necessarily sure of what ought to be included in, and what ought to be excluded from, the meaning of this term. The mere matter of strict definition here is of little con-

sequence just now, but it is of consequence to point out that such aspects of an individual's behavior equipment as are referred to by the term in general should be considered in an analysis of an individual.

This would mean, therefore, that in attempting to act the part of a counselor in aiding an adjustment between an individual and some aspect of his vocational or educational life, it would be advisable if possible to take into consideration along with the many other kinds of information these characteristics of the individual.

Reliable data available at present concerning the individual himself are in most cases rather meager. As suggested above, we attempt to analyze him perhaps in terms of such data as a score in some intelligence test, his academic grades, records from achievement tests, special data concerning very outstanding behavior, and outstanding impressions obtained thru casual observations. These impressions are frequently used to the advantage and comfort of the counselor rather than of the individual being counseled, and are frequently unreliable, for reasons which shall appear presently.

From the large amount of emphasis placed upon information, with respect to the elements other than the individual himself, at least two conclusions regarding the significance of the individual traits involved are possible: (1) that these behavior factors are of little consequence in effecting a favorable adjustment, or else (2) that individual differences in these behavior traits are so small as to merit little emphasis. To either of these, most psychologists could not subscribe; neither would the large majority of those in guidance work.

I should like to call attention in this paper, therefore, to two points particularly. One is that it is important to make as complete an analysis as is possible of the individual's behavior traits that are important in affecting his adjustment, just the same as it is important to study the characteristics on the other side of the equation, namely, the situation to which adjustment is to be made. Much progress has been made in this first matter already. For example, the use made of results from standardized tests belongs generally under this head. But in addition to these, attention should be given more earnestly to a consideration of these other behavior characteristics of an individual, which if properly studied will make still more valuable other data which we may obtain on the individual. The other point which the writer desires to emphasize is that, altho some attention is being given this phase of the problem by all of us, the commonly used method of analyzing the individual in regard to these behavior characteristics is inadequate, and in some cases not only inadequate but to a degree unfair and unrepresentative.

The first of these points may easily be found expressed in the words of some of the leaders in the field of vocational guidance and counseling, for literature abounds in such presentations. For example, Edgerton states (4, 74)* concerning duties of those charged with guidance that one of them is: "coöperating with teachers in keeping cumulative records of each pupil's performance both inside and outside (where pos-

* The first number in each such parentheses indicates the correspondingly numbered reference in the bibliography at the close of the article; the second number indicates the page.

sible) of school. Counselors and other school representatives are interested in the results of tests of general intelligence as a basis for general classification but they also recognize the importance of interpreting these records of a general measure as only one of the many factors resulting from testing pupils' abilities and interests in various ways through school and outside performance."

Rynearson (12, 93), in describing the guidance work in the Pittsburgh public schools, says concerning the work in the placement office for young men and women between sixteen and twenty-one years of age: "When applicants enroll in this office they fill out 'personality record cards' which give in detail the history of the case, including school, occupational and family data, personal ambitions, handicaps, and a personal description of the applicant. While the records are being taken, characteristics both favorable and unfavorable are noted in detail, including such items as dress, appearance, mental and physical reactions, approach, and attitude. The secretary's estimate is often checked by following up school and employment records."

Wardner (14, 106-107), describing the work in educational and vocational guidance in a smaller school system, as at Jackson, Michigan, writes: "A self-analysis blank is given each child soon after entering the intermediate school. This blank, together with a letter of explanation, is taken home to parents. This letter urges the parents to assist the child in filling out the blank. The self-analysis questionnaire is then returned to the school and kept in the home-room in a file as long as the student remains there; it then passes to the next home-room with the student. Each semester it is brought up to date, so that it provides a cumulative record of the child's progress and achievement as well as a record of the child's personality, aptitudes, and special abilities."

The same problem is manifested by job analysis as applied to guidance work. It seems to be held generally that an analysis should, among the many other things, yield a description of a person as to the characteristics needed to succeed best in the particular type of work analyzed. Examples of such lists of personal characteristics are far too numerous to mention in detail here even if it were necessary. A representative list may, however, be taken from the joint article by Edgerton and Cunliffe (5, 124). For example, here is a list of traits which they have listed under the term "Other Requirements: Qualities essential, such as accuracy, etc.", for a salesperson in a department store: Courtesy, goodwill, good taste, personality, memory, good eyesight and color sense, neatness, honesty, accuracy, ambition, originality, ability to coöperate and follow directions"; and for the printing trade: "Quick memory, mental alertness, initiative, patience, painstakingness, system, orderliness, neatness, artistic sense." Similarly we find a list of traits for the other types of work analyzed.

As stated before, now and then we seem to find cases in which those in the work either ignore such personal traits that might be essential in determining the counsel given, or else they appear to infer these traits from such individual data as intelligence test score, school marks, plus a few "impressions" gained thru a brief interview. Unfortunately

we have no formula available for such inferences, with any reliable degree of accuracy.

Virgil E. Dickson, of Berkeley (3, 214), states: "While mental tests have made clear that individual differences do exist in traits and abilities at birth, it is likewise true that most pupils have the capacity to take the training and to make the adjustments necessary to enable them to qualify for a considerable number of vocations. General intelligence alone will not decide the question."

In another place he writes (3, 215): "The guidance of children involves not only 'general intelligence' but the analysis of special aptitudes, or special abilities, or special types of intelligence. There is, in fact, such an overlapping of intelligence in most vocations *that special abilities become more significant as factors*, in vocational counseling than general intelligence levels."

Charters (2, 169ff) has made the problem very vivid to us from a somewhat different angle, when he says, in speaking of using the results from intelligence tests to color our attitude towards individuals and towards their probable future success: "What right has anybody to predict failure because an intelligence quotient is somewhat low? To be sure, 3 per cent of the pupils in the school may be so defective as to be hopeless, but the other 97 per cent may possibly be able to develop compensation traits of personality which far outweigh mediocrity in mental ability. We of the classroom are inclined to feel sorry for the industrious child with a comparatively low mental score, who by dint of hard work keeps abreast of his class. 'Isn't it unfortunate,' we say, 'that he isn't bright?' We should rather say, 'Isn't it fortunate that he is so industrious, ambitious, and friendly? What a fine chance he has for success in the game of life where there is no particular correlation between success and brightness.' It is high time for all of us to follow the wise observers of men of affairs and give to personality the credit and place of importance it deserves. In making an inventory of a man, industry, forcefulness, leadership, sympathy, and ambition are major headings, which combined yield nothing in importance to brains and mental brightness."

Concerning the use of knowledge of personality traits in sectioning classes, he says:

"The door should not be shut in the face of ambitious youths, just because there is a slight question as to their mental level. As I have said, success is far too complexly conditioned to be measured by a formula which involves mentality alone. . . . We should have *records* not only of intelligence quotients and of educational works, but of *personality quotients* as well. The school record of a child should contain not only his high school grades and his mental score, but his rating as well in certain fundamental traits of personality such as industry, ambition, friendliness, dependability, initiative, self-confidence, resourcefulness. Only by these means can we hope approximately to predict his performance in succeeding grades or in his later adult life, and only from such data can we derive an index of his personal accomplishments. It may be more significant that a student raise a rating of "D" in self-con-

fidence to a "B" than that he be the brightest student in the class. If somewhere along the years of his schooling he suddenly rises in his rating in ambition, the prosy symbol on his record may mean the dramatic turning point in his life. A low, but improved—or gradually improving—grade in initiative may often be a mark of greater progress than a superior grade in intelligence or a grade of "A" in class work. The traits of personality which we often *treat so casually in our records* need to be brought out into the focus of pedagogical attention and given the position they deserve.

"I have seen many bright executives fail because they were irritable and unfriendly, and conversely, I have witnessed an immediate rise in efficiency when after effort they begin to overcome these faults. I have also seen men of superior intelligence and training completely and despondently fail because of lack of self-confidence and have witnessed a consistent and spectacular rise of these same men when their confidence in themselves was restored. Men and women who have become nervous and irritable because they did not know how to relax have prolonged their educational careers and conspicuously increased their happiness by the mere development of the ability to take things easy.

"In the presence of all these facts, it is self-evident that ideals and traits play a considerable part in all measurements of people. Theirs is a supplementary rôle; they compensate intelligence. Success cannot be predicted with safety by tests of mental alertness alone. Mental and scholastic records must be supplemented by ratings of personality traits. Teachers and administrators can use intelligence quotients safely within definite limits, but again it must be remembered that success is too complexly conditioned to be predicted by a single mental formula."

F. G. Nichols (10, 223), concerning vocational guidance in commercial education, writes: "It should be obvious that personal characteristics, mental abilities, mechanical powers, social understanding, occupational aptitudes, coöperative attitude, etc., which are known to be essential to success in an ultimate goal, business position, or relationship should be made the basis of our prognostic testing program."

These quotations, then, should serve to put before us the fact that for purposes of best vocational guidance and counseling we should have available as complete and as accurate data as possible concerning the various individual traits that may at all have any appreciable part to play in determining the success with which the individual is able to make the necessary adjustments. If such facts are not at present available, we should look forward to obtaining them for use as soon as we may do so.

We need no further argument that these traits are important in adjustment. And undoubtedly, if they were easy to measure, we would all gladly consider the results from such measurement. But easy and direct measurement is not possible. On the other hand, we have used the snap-shot impression method and perhaps have come to revere it for its long use. After briefly considering the commonly used method, we shall turn to one which may offer better results.

Let us consider now the problem of method, the second point. It is

true that practically everybody who acts as a counselor, realizing the limitations of his more reliable data, goes beyond them in counseling and bases his actions upon what he believes to be characteristic of the individual. For example, he says, "John is a good kid," or "John is a dependable fellow," or "John's a likable chap," etc., when actually he has nothing more than an impression or a series of unrelated and irrelevant impressions upon which he bases his statement. This perhaps represents the method used in most cases, that is, the judgment is based upon mere impressions gained in an interview, or memories of impressions obtained thru uncontrolled observation, which may have very little real significance for the problem at hand.

To fill in blanks by this method may be better in certain cases than to leave them unfilled. But as a rule it is not to be encouraged and should not be resorted to when the local situation would permit the use of a better available method. Nevertheless the method is quite current. A glance thru reports of programs of vocational guidance work in specific places reveals a number of instances in which the only data on many of these behavior traits are obtained thru one interview, or while the individual is filling out some other sort of questionnaire, or perhaps by isolated memories on the part of the counselor. Experimental literature provides us with an abundance of dependable evidence that without due precaution, as a rule, this method yields extremely unreliable data. For example, by using this snap-shot sort of method, this type of situation would probably occur. If individual "A" is appraised with respect to behavior traits x, y, and z today, the chances are that he would be assigned by the same person a somewhat different rating with respect to these same traits again tomorrow or next week. The standards used and the evidence obtained differ quite remarkably from one time to another. Of course the person who does the appraising would not be aware of this unless his judgments were put in quantitative form and shown to him. If he is the typical naïve judge, he would probably then think that someone had juggled the data. Or we might expect to find, more frequently still, another sort of situation. The person doing the appraising might assign the same amounts to these traits when rated today and again next week, but the assigned value might be misrepresentative or inadequate both times because the appraisor is judging in terms of irrelevant data, or according to entirely the wrong standard, merely because his attention has never been called to the fact specifically. Had the appraisor thought analytically about the matter he would not have made this error perhaps, or had he known what to look for and had then made observations specifically on one or more occasions in terms of a more definite standard which might have been developed, such an error could have been either avoided or tremendously reduced.

Some of us who still maintain that as individuals we are able to judge accurately the amount of these various individual characteristics in another by such snap-shot methods simply have a good jolt coming to us. Such individuals have not been found for experimental conditions. We have "gotten by" thus far with such methods partly because no one has checked us up on them.

Of course in school work those who act as counselors have been acquainted with the students for some time, and they might maintain that their appraisals of the behavior characteristics are thus based upon long acquaintance and on quite a wide variety of situations and are therefore reliable and valid. But this may mean little more for the purpose of appraising accurately the individual. It is not merely a matter of having known the individual long or having observed him much. Experimental results point out that mere amount of observation is of little consequence on this point. Someone has said that a man who has been fooled a longer time than another is therefore a bigger fool than the other. I cannot vouch for this statement, but it may have a suggestive value; much use has little if any advantage over less use of an inadequate method. It seems, therefore, that from the standpoint of grading an individual with respect to such behavior traits as we have referred to here, the very commonly used method of so unsystematically rating an individual offers little of real value in the way of permitting us to base guidance upon these less tangible behavior traits of those with whom we, as counselors, may deal.

Let us turn, therefore, from this method to the essentials of a more significant method. This problem of method has been subjected to much intensive study. So far as any attempt to find and apply a method for this purpose on a broad scale is concerned, we find its beginning in the personnel work done by the psychologists in the United States army during the late war.

As has already been made clear, such behavior traits cannot be measured directly, since at the present time we have no instrument or device for measuring them according to a predetermined scale and apart from other people. But some standard of behavior must be determined by means of which the trait, as expressed in a given individual, may be compared. The only standard which has thus far been determined as at all satisfactory consists in the amount of this trait possessed by certain individuals who meet given requirements. The assignment of a value of a particular individual with respect to a specified trait then involves a comparison with certain others who serve as the standard. We refer to such an assigned value as a rating. After all, any of our measurements of the mental or behavior characteristics of people are only relative in this sense. I shall attempt to make clear some of the essentials of a method which may serve us more usefully in obtaining some of these so-much-desired data on other personal characteristics. The best methods now obtainable are not perfect, but they are in what we might call a usable stage, when they are employed with discretion.

Experiment has revealed the fact that if the measures of these less tangible behavior traits even approach reliability and validity, at least these conditions must be met: (1) the rater, the one who estimates the amount of a given trait in another, of these behavior characteristics, must define and use some sort of a fixed standard by means of which to compare the behavior observed. (2) The behavior observed must be relevant to the characteristic being judged. More specifically it would mean something of this sort. Suppose we were considering the trait

of coöperativeness within a particular individual. This would mean that before we indicate that this individual is very high, or very low, or medium, as the case may be in this trait, we must have some standard by means of which we assign this value to him. Furthermore, we must be sure that we are really judging him on the basis of behavior which manifests coöperativeness of the type we are thinking of, rather than some other kindred trait, such as docility. These two principles are very frequently violated in the ordinary procedure.

It should be added as a corollary that the rater should make his estimate by observing specific reactions *with this definite purpose in mind.* It is well known that we see usually what we expect to see and what we are prepared to see. A large error is involved when ratings are made merely from memory of general behavior, or upon behavior observed from a different point of view.

Two other points should be mentioned in this connection. The accuracy (the reliability and the validity) of such a rating has been found to be greater if such ratings as would meet with the conditions mentioned above were made and recorded at various intervals, each successive one being made independently of the previous ones, and if we then take, as the final measure of such trait in an individual, the combined ratings made at the various times. Or if appraisals or ratings, by say about three persons, be made under the above-mentioned conditions then the combined result of all raters may be taken as the best indication of the individual in regard to the trait in question.

Now let us see, by means of a review of these above-mentioned points, the requirements which should be met in order that the rating be reliable and as valid as possible. They are: (1) The appraisor should have as definite and as objective a standard as possible with which he can compare that which is being observed and thus evaluate it. (2) The judgment must be based upon an observation of behavior which is relevant to the characteristic being appraised. (3) The rater should base his rating upon observations in which there was a definite purpose of determining this specific thing. (4) If possible the rating actually used should be the composite of a number (perhaps three) of separate ratings, each made independently of the other. Each rater's judgment should be the result of an adequate number of observations and recorded at adequately spaced intervals.

It must be admitted that it is not an easy matter always to meet these requirements. It is very essential, however, when ratings are used seriously, that these be approached as nearly as possible. In a number of cases in industry where these personality factors assume such a dominant rôle these requirements have been met sufficiently well to allow those in charge to obtain data of significance. By training and practice of these points mentioned above, the reliability of ratings has been very much increased. Because of a lack of space I shall not report any results recorded from applications of this method to industry, but shall stick more closely to the school situation. It seems to the writer that, on the whole, the school systems offer better opportunities for the application of this method than do some of the industrial situations in which it is reported that significant results have been achieved.

Let us turn our attention now to one or two illustrations of an adaptation of the method at work.

W. Hardin Hughes (5), (6), (7), (8), in the Pasadena public schools, has been among those who have published results more elaborately. According to his reports, all high school students there are rated by all their teachers on the following twelve traits: (1) regularity and persistency; (2) sense of accuracy; (3) confidence in own ability; (4) quickness of thought; (5) control of attention; (6) retentiveness of memory; (7) trustworthiness; (8) initiative and aggressiveness; (9) respect for authority; (10) coöperation in group activities; (11) force of personality; (12) capacity for leadership. Specific directions are provided each teacher for rating each student on each trait. For example, on a printed blank the teacher is told in rather specific terms what is meant by each of these traits in terms of behavior which may be observed. Each one is aware in advance that the ratings are to be done and urged to make specific observations for this purpose. Thus an attempt is made to assist each rater in setting a standard less variable than those usually employed, to have him familiar with the use of such a standard, and to have the raters judge relevant behavior situations with the specific purpose of obtaining the best possible information on these points at issue. This program began in 1923 and, according to report, it has been elaborated and refined during subsequent use.

Upon the description of so elaborate a scheme as this, we are inclined doubtlessly to want to raise certain issues on the reliability and the validity of the data thus obtained. It is not my purpose to subscribe particularly to this particular piece of work. Nevertheless, we must admit that results have been obtained, which, according to his reports, have much significance. From several ways of studying them, Hughes states that the data are of significant reliability. These matters will not be discussed here.

From his results, of course, he finds wide individual differences among high school students in these traits. Some of the desirable traits go along, as reported in his study, with high degrees of intelligence as determined by Terman's Group Mental Ability Test, whereas other traits seem to be very slightly related to general intelligence as thus measured. He states that much help is given in understanding many discrepancies between other data, and often such data are provided as will enable those in charge to assist much more helpfully in bringing about more satisfactory adjustments, both while the student is in school and after he is out of school.

Among other uses made of the data, he has studied the results of these ratings in connection with some later adaptations which the students have made. For example, he has found that there is a significant, tho not perfect relationship, between the ratings assigned in this manner, and the academic success which the students achieve in university and college work after having completed the high school work. In connection with the records made on the intelligence test taken in college, he finds, using only a very limited number of cases, that the

information derived from the ratings in high school may be expected to aid materially in predictions, at the time of entrance, concerning probable academic success. He suggests that this may be typical of other results to be obtained in other applications.

Mort and Stuart (13), in an article on a somewhat similar study in Arsenal Technical high school, Indianapolis, describe very briefly a simplified form of somewhat the same method.

These authors point out that one of the difficulties in using any rating scheme on a large number of pupils is the matter of time and clerical help involved. In order to overcome these difficulties as far as possible, without at the same time sacrificing too much value, they have recommended and outlined an abbreviated method for describing the personal characteristics of high school students. The points which they treat are included under the five following heads: (1) personal characteristics; (2) respect for property; (3) manifestation of ability in business; (4) school welfare; (5) community welfare. Instead of being asked to report on every case, teachers were asked to report on exceptional cases only. Furthermore, they were not asked to rate these exceptional cases but only to report them. (This is a modified form of the check system.) If a student did not stand out remarkably from the others, the teacher did not report him. She was therefore required to make no report on the large mass of students. Furthermore, she was saved the difficult task of assigning relative positions to the students. Under this arrangement the teacher making the report had ample opportunity to observe particular behavior traits with the specific purpose in mind. The report does not inform us concerning the aid given the teacher in developing standards. These records were accumulative.

Each of the five traits mentioned above were in turn subdivided. Personal characteristics were first divided into physical appearance, expressions, character, and each of these in turn was divided into a number of other parts. For example, under character were found honesty, reliability, thrift, courtesy, good judgment, perseverance, open-mindedness, orderliness, thoroness, courage, self-respect, accuracy, self-sacrifice, industry, coöperation, generosity, loyalty, self-control. Neither of the other two items had quite as many subdivisions.

Records were kept for each student reported by placing the data thus obtained on a 3 x 5 slip with merits or demerits according to a prearranged method of evaluating the marks on the reports. By way of showing the implications of this method, summary tables are presented for students graduating in 1926. Thirteen per cent of the pupils received no merit reports, 50 per cent of the pupils 6 or less, 10 per cent of the pupils 25 or more. Demerits were not reported so freely. The authors state that of twelve pupils receiving the highest number of merit reports, ten are on the school scholarship honor roll; and of the twelve pupils with the greatest number of demerits, but two are on the honor roll. In addition to this, of course, there are some rather wide deviations from the tendency represented above. They did not report any attempt to determine which of these traits were significant and which were less significant. This might have ironed out some dis-

crepancies. Also no report is made of any study on the reliability and the validity of the data.

Quoting from the authors on the application of this plan, it is stated: "While there may be those who will hesitate to give up, for the purpose of office record, the rating of every pupil in such matters as personality, the use of the plan described for a personality rating scheme which through meritorious citations serves to bring out positive leadership and through demerit citations serves to deter and correct the wayward is feasible."

These are among the outstanding sample applications of this method, or adaptations of it. As has already been suggested, there are many difficulties and problems to be met, but none in the cases in which it has been tried have been insurmountable, as reported, from the point of view of gaining results which have had value. Doubtless we shall at the end of the next decade look back upon the efforts of this time and call them "primitive." But unless some attention is given the problem, we shall not be much better off then than we are now. We do not expect to proceed in such an undertaking as this faultlessly; but of course we should always proceed in the light of available information and help.

H. B. Wilson (15), superintendent of Berkeley schools, states a quotation from Dickson as follows: "The writer is aware of the difficulties of attempting to analyze character traits or to measure them or to rate them, yet the fact remains that one individual can be observed to have the habit of industry more than another in meeting the situations of a day, a week, or a semester. The same is true with reference to other traits. If an individual shows honesty or industry only on specific occasions or with specific problems then that is worth noting. Although the rating schemes for conduct or character are imperfect and are subject to logical criticism, they represent a working tool which can be used to some advantage in calling attention to growth in desirable habits and to the avoidance of bad habits. If such schemes are used wisely and with emphasis on keeping right motive behind all conduct, they furnish a usable tool for character education in the hands of the teacher."

Tho the essentials of such a method have been outlined, it must be borne in mind that there would be several questions to be decided before it could be put into operation in any particular school system. It would be necessary to determine such matters as the following: (1) what traits are to be studied; (2) how the results are to be represented; (3) how frequently the ratings are to be made; (4) who are to make such ratings; (5) how the standards are determined by which ratings are to be made; (6) how many students are to be rated, etc. The answer to some of these depends upon the purposes to which the results are to be put, the number of students, the intimacy with which the rater may observe the one to be rated, the arrangement possible for keeping records, etc.

The advantages of the type of method suggested here are numerous and clearly outstanding, especially to those who are familiar, from

the research point of view, with the problems involved here. The results will not be absolutely reliable and valid, just at present at least, but they will be of far greater reliability and validity than those provided by the usual method of reporting so unsystematically. With the effort to determine standards by means of which the individual is to be judged, studying, defining, and *re*-defining what one is seeking and how to look for it, we may expect to find a far more significant form of behavior upon which to judge the amount of the characteristic. By knowing more definitely what one is looking for, by making specific observations with this aim in view, we are much more likely to get the thing we aim at instead of something else. Thru repeated ratings and thru using a composite of the whole number the dealing with the student will be much less erratic and may be expected to represent much more nearly the true situation in the individual. When an individual, as a rater, knows that he has to file some record for a student, knowing that it will have to stand as his product, that others are observing the same thing in the same way, and that the record which he turns in is to be compared with that of someone else, it is not particularly difficult to see that the rater may be encouraged to take his task somewhat seriously. Studies have shown that, with diplomacy, the individual in charge of the whole affair may stimulate those to desire really to do about the best they can. The return result upon the rater can readily be seen.

The value of such an undertaking depends very heavily upon the significance that may be attached to the records themselves, i.e., how nearly they represent what they are supposed to represent. It may be some time before we are able absolutely to find any way of determining just how valid they are, that is, how nearly they represent what they are supposed to represent, since we have no very definite criterion against which to check many of them. However, if scientific principles be adhered to, and if the results can be shown to have practical value, the effort deserves to be encouraged.

From studies already made it seems possible to meet these conditions. For purposes of emphasis, it might be well to point out more specifically the results that have been found and may be expected to be found:

1. By thus getting the best possible picture of the individual (his weakness, strength, etc.), we may be able to deal with him better in counseling and guidance. He can thus better be measured against the requirements of various sets of conditions. This is of particular importance in dealing with the more outstanding cases, either for adjustment in the school system or beyond the school system.

2. The value of job analysis will be enhanced, inasmuch as, particularly, the qualities as called for therein may be sought out more accurately and those who have those traits as called for may be guided more wisely. (It might be in place here to say again that even tho in our job analysis we assert that certain traits are needed, such statements are of little consequence unless they can be identified in people. Some people might be tremendously humiliated if they were actually to check up on their results.)

3. Other data, which when used alone seem to be of very limited significance, take on much more significance when used in connection with supplementary data as suggested herein.

4. A fairer picture of those who are rated will be given, inasmuch as the record may show how the individual stands as judged, by those who know him, with respect to many of the important behavior characteristics. As it is now, we usually find those things emphasized which, at the time the ratings were made, were in line with the mood of the rater.

5. The meanings of these behavior traits so frequently mentioned as important will become more clearly defined so that they may be observed.

6. When records are established, the significance of the much-tooted necessary traits can be determined. Those which have no significance or those which have much significance may be dropped or emphasized, as the case may turn out to be, from that long list of traits carried around and paraded verbally every time we wish to explain some phenomenal situation. I suggest modestly that the membership of such a list may be changed after such study.

7. It has been emphasized by some that more definite educational ideals may be established, and progress in achieving them may be more definitely measured.

8. The student himself, if the issues are brought tactfully to his attention, may see more clearly the things which really count, and help in the direction of himself toward them. At present, so far as I am aware, we have no experimental results on this point, but it is in line with what may be expected in terms of our other knowledge.

SUMMARY

In order to be instrumental in the adjustment of individuals and educational or vocational conditions, we need to know all we can that is relevant, about both elements, the work and the individual. It is the analysis of the individual that is emphasized in this paper. Besides the valuable information concerning him which may be given by standardized tests, records of school achievement, etc., we should strive to get as accurate a knowledge as possible of his behavior traits, that is, a part of the behavior mechanism by means of which this individual functions. The significant traits under this heading need more clear-cut definition and consideration and need to be studied in relation to the way in which they may affect the individual's adjustment. The usual method by means of which they are commonly used is inadequate and is subject to many errors. Some suggestions for a more nearly adequate method have been suggested. We have no means at present for measuring these less objective traits or abilities with the use of a standardized test, and the best available method is not as reliable as we would desire, but under careful direction it can be used, as found in both industry and education, with useful results.

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